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EXPERIMENTAL VERIFICATION OF THE PROGRAM OF IMPROVEMENT OF PHYSICAL TRAINING OF OFFICERS-INSTRUCTORS AT HIGHER EDUCATIONAL ESTABLISHMENT OF THE MINISTRY OF INTERNAL AFFAIRS OF UKRAINE

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Annotation. Grounded, developed and tested efficiency of the program of improvement of physical training of officers-teachers. Borne change in organization of physical training, correlation of volumes of general and special physical training is changed, reading is entered with a prophylactic and training orientation. The level of physical preparedness of teaching staff of institutes of higher is investigational. In research 62 officers-teacher took part under age 40 years. The level of physical preparedness was determined on results at run on 100 meters, undercuttings on a cross-beam and runs on 1000 meters. It is set that employments on the experimental program were instrumental in more expressed growth of level of physical preparedness of teachers. A difference between the indexes of officers of experimental and control groups in speed qualities makes 0,12 seconds, in power qualities - 1,8 times, in endurance - 40,5 seconds.
Keywords: physical, training, program, officers, teachers.

Introduction.

Physical preparation plays an important role in preparation of skilled, moral and faithful to the state ideals law-enforcements [1, 6, 8, 10-12]. At the same time, in the orders of Ministry of internal affairs (MIA) of Ukraine is determined that quality of organization and realization of physical preparation with the workers of organs of internal affairs (OIA) became worse in recent year. As a result, the level of physical preparedness of workers goes down and estimated mainly on "satisfactorily" and "unsatisfactorily". Especially this problem sharply touches the teaching staff of higher educational establishments of MIA of Ukraine, professional activity of which is characterized the substantial decline of volume of physical activities (Collection of documents about organization of professional preparation on 2010-2011. K., KNUIA, 2010, 24 p.) [3, 7].

The analysis of organization of physical preparation in institution of higher education of MIA of Ukraine allowed to educe row of defects that reduce efficiency of physical preparation [2, 9]. Among them: the insufficient accounting of features of official activity of scientific-pedagogical staff in the leading documents; not enough order of organization of employments; considerable percent of admissions of employments; grant of advantage on employments to the improvement of indexes of the special physical preparation and preparation to verifications; plenty of addresses to medical part and high percent of teachers that on the state of health are attributed to the group of curative physical culture.

Scientists [5, 7] notice that efficiency of professional activity of teaching staff of institution of higher education depends on the level of development of physical qualities, motive abilities and skills, formed by systematic implementation physical exercises adequate to the requirements, to character and by the terms of official labour. This dependence is confirmed by validity of conformities to law of interactionof physical and professional qualities, motive abilities and skills that develop and improve in the process of physical preparation and capture a profession.

In works of row scientists are concentrated attention on the special physical preparation of workers of militia [5, 6, 8]. At the same time, according to V.G. Babenko and V.P. Leont'eva [1, 7] to develop and perfect physical qualities, and improve efficiency of official activity facilities of the special physical preparation, not having a sufficient level of body-conditioning, can not be. Exactly the high level of body-conditioning allows to develop basic physical qualities, improve functional possibilities of organism, strengthen a health, promote a capacity and form the background of development of the special qualities of officers-teachers.

Thus, the analysis of literary sources allows to make a conclusion, that one of the directions of decision of the above-mentioned problem is perfection of general physical preparedness of officers-teachers on the basis of application of simple and accessible facilities taking into account the age-related group and time of realization of employment in the mode of day.

An article is done according to SRW in the sphere of physical culture and sport 2011-2015 of Ministry of Ukraine in matters of family, young people and sport within the limits of theme 3.8 "Theoretical-methodological bases of construction of the mass checking system and estimation of level of development and physical preparedness of different groups of population" (number of state registration 0111U000192).

Aim, tasks, materials and methods.

Aim of work – to check the efficiency of experimental program of physical preparation of officer-teacher perfection of institution of higher education of MIA of Ukraine.

Tasks:

- to ground the authorial program of perfection of physical preparation of officers-teachers of institution of higher education of MIA of Ukraine;
- to investigate influence of employments on the authorial program on the level of physical preparedness of officers-teachers.

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Methods of research. Theoretical analysis and generalization of literary sources, pedagogical observation, testing, pedagogical experiment, methods of mathematical statistics.

Organization of research. With the aim of research of efficiency of the authorial program, we organize a pedagogical experiment in the National academy of internal affairs (NAIA) in a period from 2010 to 2012. In research took part officer-teachers (man) aged 40 years old (n=62). To the control group entered 32 officer-teachers, who occupied according to operating system of physical preparation, to experimental - 30 teachers that occupied on the authorial program. A level and dynamics of indexes of physical preparedness of officers-teachers was analysed.

Results.

Official activity of officers-teachers of institution of higher learning of MIA of Ukraine, that is in conditions of subzero motive activity and action of other unfavorable factors, proposes high requirements to the level of their physical preparedness, health and mental capacity.

The tasks of physical preparation of teaching staff certainly according to the terms and features of official activity of officers-teachers: increase of level of general physical preparedness of health strengthening, improvement of the functional state, prophylaxis of diseases, lengthening of professional longevity; providing a high level of mental capacity; perfection of firmness to negative factors of official activity; forming of motivation to the systematic engaging in physical exercises and sport.

It is set that facilities of physical preparation of teachers that can assist the decision of the marked tasks, must be simple, accessible and simultaneously effective and health exercises of body-conditioning.

Certainly, that engaging in physical exercises must get organized and conducted taking into account the features of official activity, age-related groups of officers-teachers, and also time of employment during working day. So, application of physical exercises in the mode of day of officers-teachers must be sent to the decision of such tasks:

- in the process of teaching process (while holding studies) – to change the dynamics of subcortical processes, create an optimal background of excitability; to improve cerebral circulation of blood and metabolism, actively influencing on the cardiovascular system; to carry out prophylactic influence on a locomotorium and organs of digestion; to liquidate the stagnant phenomena (especially in the area of pelvis and lower limbs); to provide a high mental capacity (to improve the indexes of memory, thinking, attention); to improve the emotional state;
- at the end of working day (after realization of employments and completion of other types of intellection) - development and perfection of physical qualities; strengthening of muscles; strengthening of health, improvement of activity of and other cardiovascular, respiratory systems of organism; decline of action of hypodynamia and other unfavorable factors; proceeding in a capacity.

Based on works of leading scientists [1, 5, 7] and taking into account the results of searching researches [2, 3, 4], we worked out the program of perfection of physical preparation of officers-teachers of institution of higher learning of MIA of Ukraine.

The main purpose of the authorial program - to provide a high level of professional activity of officers-teachers facilities of physical preparation.

The tasks of the program: increase level of general physical preparedness, strengthening of health and improvement of the functional state, improvement of mental capacity, prophylaxis of professional diseases and lengthening of longevity, bringing in to engaging in physical preparation.

The features of organization of employments on the authorial program are: realization of employments after a repressing orientation on development of general physical preparedness; gain in specific weight of exercises on development of endurance and power qualities in maintenance of employments after teachers; realization of employments in a volume that answers normative documents (4 hours per week); depending on time of employment in the mode of day, realization of employments after a prophylactic and training orientation; a rational dosage of loading depending on the orientation of employments, level of bodily condition and age-related group of teachers; simplicity and availability of exercises will allow to provide the high closeness of employments and positive effect for teachers with the different level of physical preparedness and different age-related groups; minimum material charges for organization of employments.

According to leading documents the volume of employments after physical preparation on a year for permanent composition is 192 hours. From them: 100 hours on general and 92 - on the special physical preparation. Author program offers engaging in a body-conditioning to plan 144 hours on a year, for employments after the special physical preparation - 48 hours.

Depending on time of realization of employment in the mode of day, according to author program is offered realization of employments after prophylactic and training orientation. In a week's loop two employments on 1 hour with prophylactic orientation and one 2-hours employment with training orientation. Planning of employments on the author program is depended upon the chiefs of departments, depending on the educational loading of every teacher (on the basis of curriculum of lessons). Employments with prophylactic orientation were conducted as a rule between the first and third, between the second and fourth double periods, with training orientation - after realization of lessons or at the end of working day. The size of loading that was got by teachers in the process of employments is stale from the orientation of employment, time of realization for a day, age-related group and level of preparedness of teachers.

Efficiency of author program was tested during a forming pedagogical experiment. The indexes of physical preparedness of teachers of experimental and control groups on results implementation at running on 100 m, chin-up and running on 1000 m.

The analysis of results from running on a 100 m testifies that at the beginning of experiment, and also after the first, second and third stages of research the indexes of development of speed qualities for the officers of both groups inter se do not have a reliable difference (P>0,05) (table 1).

Only at the end of experiment indexes of teachers of EG at running on 100 m are certainly better, than at officers of CG on 0,12 c (P<0,05). There is a reliable improvement of speed indexes in EG – difference between basic data and results at the end of research presents 0,25 c (P<0,001) (table 1). In KG basic data and results fixed during completion of experiment inter se do not differ for certain (P>0,05).

Shown by teachers results did not have a reliable difference in undercutting during determination of weekend of data and after the first and second stages of experiment (P>0,05) (table 1). Influence of employments on the authorial program on development of power qualities of officers-teachers marked more brightly, beginning from the third stage of research - the indexes of teachers of EG are for certain higher than for the teachers of CG in 1,26 times after the third stage (P<0,01) and in 1,76 times at the end of research (P<0,001). During the experiment results for the teachers of EG grew in 1,8 times (P<0,001), for the teachers of CG of loud speaker of results has stable character (table 1).

Table 1

Dynamics of general physical preparation of officer-teachers of EG and CG according to basic exercises during an experiment

Stage of research	EG (n=30)			CG (n=32)			Reliability of difference	
	$\bar{X}$	σ	±m	$\bar{X}$	σ	±m	t	P
Speed quality (running on 100 m, c)								
VD	15,72	0,27	0,05	15,66	0,27	0,05	0,85	>0,05
1	15,61	0,26	0,05	15,69	0,22	0,04	1,25	>0,05
2	15,57	0,25	0,05	15,61	0,21	0,04	0,62	>0,05
3	15,53	0,27	0,05	15,64	0,21	0,04	1,72	>0,05
4	15,47***	0,22	0,04	15,59	0,23	0,04	2,12	<0,05
Force qualities (chin-up, quantity)								
V.d.	7,93	2,02	0,37	8,06	2,42	0,44	0,23	>0,05
1	8,00	1,98	0,36	8,13	2,37	0,42	0,22	>0,05
2	8,83	1,46	0,27	8,03	2,43	0,43	1,56	>0,05
3	9,17	1,32	0,24	7,91	2,21	0,40	2,69	<0,01
4	9,73***	1,36	0,25	7,97	2,14	0,38	3,82	<0,001
Endurance (running on 1000 m, c)								
V.d.	246,73	20,90	3,88	243,87	25,38	4,56	0,48	>0,05
1	235,27	17,23	3,20	248,12	22,16	3,98	2,52	<0,05
2	228,63	12,52	2,33	242,03	21,00	3,77	3,02	<0,01
3	219,77	9,78	1,82	249,08	22,55	4,05	6,60	<0,001
4	211,80***	8,55	1,59	252,27	21,04	3,81	9,80	<0,001

N o t e. Statistically meaningful differences of middle at the beginning and at the end of experiment: «*» - P<0,05; «**» - P<0,01; «***» - P<0,001.

It is necessary to notice the special effect from employments on the authorial program on the indexes of general endurance of teaching staff of institution of higher education. After the first stage of research a level of development of endurance the officers-teachers of EG had for certain better, than in CG on 12,85 c (P<0,05) (table 1). After the second stage of experiment the officers-teachers of EG and KG have a difference between middle results from running on 1000 m presented 13,4 c (P<0,01), after the third - 29,31 c (P<0,001), at the end of experiment - 40,47 c (P<0,001) (fig. 1).

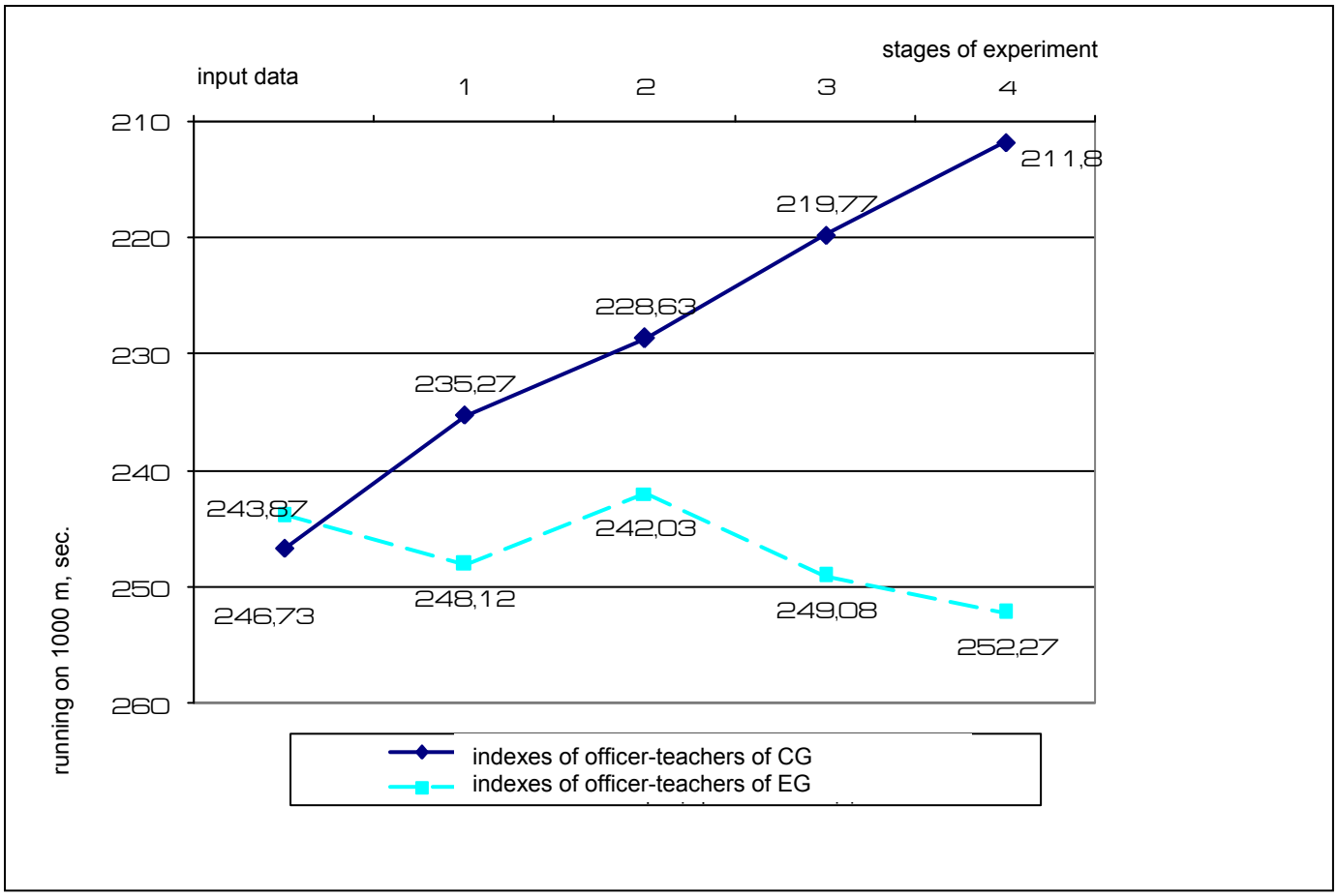

Fig. 1. Dynamics of indexes of officer-teaches of EG and CG endurance according to the results of running on 1000 m during the period of experiment (s)

The analysis of dynamics of indexes of endurance showed that the officers of EG have a continuous height of results from running on 1000 m during a pedagogical experiment ($P<0,001$). For the teachers of CG the level of indexes of endurance became worse during experiment, but results certainly did not change ($P>0,05$) (table 1, fig. 1).

Conclusions.

As a result of introduction of the authorial program changes it was change organization of physical preparation of teaching staff, that envisage realization of employments after a "flexible" chart depending on the educational loading of teachers; change a correlation of volumes of general and special physical preparation, that envisage the increase of specific gravity of body-conditioning (to 144 hours on a year); introduced exercises with prophylactic and training orientation depending on time of employment during working day; increased a level of attendance of engaging in after physical preparation teachers to 95%. As a result, the indexes of physical preparedness of officers-teachers of experimental group are improved.

Prospects of further researches. It is envisaged to ground, to work out and experimentally check the program of physical preparation for the officers-teachers of women in higher educational establishments of institution of higher education of MIA of Ukraine.

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ABOUT FORMING OF PERSONALITY PHYSICAL CULTURE OF STUDENTS IN THE PROCESS OF PHYSICAL EDUCATION (IN ASPECT OF PRESENCE OF ABILITIES)

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Annotation. It is shown that practice of teaching of discipline «Physical education» does not provide forming of volume of abilities, sufficient for the origin of athletic activity. Prevail ability to pick up a place, sporting form, inventory depending on the type of physical exercises and ability on the observance of rules of the personal hygiene. In the questionnaire questioning 650 students (324 youths and 326 girls of the first and fourth courses) took part. All of students visited employments on physical education at school and institute of higher. It is marked that the important task of amateurish athletic education is forming for the students of the personal experience of independent athletic, health and рекреационных employments. It is underlined that sense of amateurish athletic education of students consists in achievement by a man unity of mental and activity processes. Such processes are needed for an estimation and understanding of the state of the health, programming and residence of healthy way of life.
Keywords: abilities, facilities, physical culture, activity.

Introduction.

Amateur physical culture education of students must assist to forming of two important components, where personality is oriented on the folded "character" of the physical culture future. It is a certain sum of the mastered cultural norms in form concepts and knowledge, abilities and presence of creative capacities for creation of new activities, related to strengthening of health in the situations even not provided with the norms of culture [1-3].

In all plenitude maintenance of students' physical culture education must suppose mastering of next important components.

Cultural-historic component. Sports-educated man must know the basic landmarks of history of physical culture development, including its features in different periods of civilization, at different nations, in different cultures and ethnoss and, first of all, in those to whom it belongs. To understand the essence, setting and device of space of culture physical. To know about norms, standards and models of culture physical. To know a structure and setting of the authorial physical culture and health systems (Mikulin, Amosov, Dikulya and other).

Vision component. Presence of ideas about the pictures of the world, role of natural-science and activity pictures of the world. Acceptance of physical culture education of a man, sport activity and activity of health building as meaningful values. Such man answers on a question about reasons of training: "I engage in a physical culture not because not healthy, and because I can not differently live".

Methodological component. Mastered techniques of reflection and understanding, ideas about the value of extreme situations in vital functions and methods of exit from them, about the "habitat" of active man – all in the context of physical culture activity and practice of health building. Formed, also, capacities to planning and programming of private lessons.

Conceptual-gnosis component. Provides for mastering such concepts "Physical culture", "amateur physical culture education", "physical culture activity", "health building", "health builder" and "recreation". Includes, also, natural-science knowledge about a device and functioning of human organism, about the phenomenon of exercise and training. About the objective and subjective methods of control after the state of health. About interconnecting facilities of physical culture and hardening, rational feed and self-massage, auto-training and psychological unloading, other necessary knowledge.

The first personal experience of independent physical culture healthy and recreational employments, begun under the direction of teacher, who has own practice of sports activity and health building [4, 5-10].

So the sense of amateur physical culture education of students consists in an achievement the man of unity of mental and activity processes necessary for an estimation and understanding of the state of health, programming and residence of healthy lifestyle. Or, otherwise speaking, forming creative personality of health building.

The article was done according to SRW of Donetsk National University.

Aim, tasks, materials and methods.

The aim of work – to establish a structure of abilities of students in the sphere of physical culture means and healthy lifestyle usage, which are necessary for appearance physical culture activity.

Methods and organization of research. Research was done in Donetsk National University, Zaporozhye National Technical University and Dnepropetrovsk National Mining University. In questionnaire took part 650 students (324 boys and 326 girls of first and fourth courses), who were attend exercises at school and at the university.

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Results.

During research we try to answer the question about *abilities* to use various facilities and methods of physical culture with the purpose of caring about the health, to exposes a degree and students' usage of present knowledge in the process of their vital functions.

Students were supposed to answer 2 questions of a questionnaire, "Can you and in what degree …" – "can well" – 2 points, "can, but not enough" – 1 point and "can not" – 0 point under the following positions:

2.1. To choose rational time for exercises in the process of education and relax.

2.2. To choose a place, sports suit, equipment according to the kind of exercises.

2.3. To make a complex of physical exercises for development of physical qualities.

2.4. To make a complex of morning hygienic gymnastics.

2.5. To define the volume of physical activity at engaging in physical exercises depending on sex, age, state of health.

2.6. To define efficiency of engaging in physical exercises on a pulse, breathing, feel, indexes of physical development and development of physical qualities.

2.7. To pick up and prepare healthy foodstuffs.

2.8. To execute the rules of the personal hygiene.

2.9. To regulate the mental condition psychoregulation facilities.

2.10. To conduct conversation on questions of making healthy with family members, comrades.

It is set during the analysis of the got results, that from ten positions in parts of the present abilities presented in the question of questionnaire, most of points among boys and girls of the first and fourth courses, occupy positions 2.2 – ability to choose a place, sports suit and equipment according to the kind of exercises and 2.8 – abilities necessary to execute the rules of the personal hygiene.

In Donetsk National University position 2.2 makes at boys of first and fourth courses – 1,53 points, girls of first course – 1,6 and fourth course – 1,58 points. Position 2.8 – at boys of first course – 1,87, fourth course – 1,68, at girls of first and fourth courses – 2,00 points.

In Dnepropetrovsk National Mining University position 2.2 at boys of first course makes 1,75 points, fourth course – 1,51 points, among girls of first courses – 1,47 points and fourth – 1,31 points. Position 2.8 – at boys of first courses – 1,97, fourth – 1,86 points and at girls accordingly 1,93 and 1,92 points.

In Zaporozhye National Technical University is saved the same tendency. Position 2.2 at boys of first courses makes 1,7 points, fourth – 1,79 points, and among girls accordingly 1,41 and 1,83 points. Position 2.8 – at boys of first courses – 1,83 and fourth – 1,91 points, girls – 1,98 and 1,95 points.

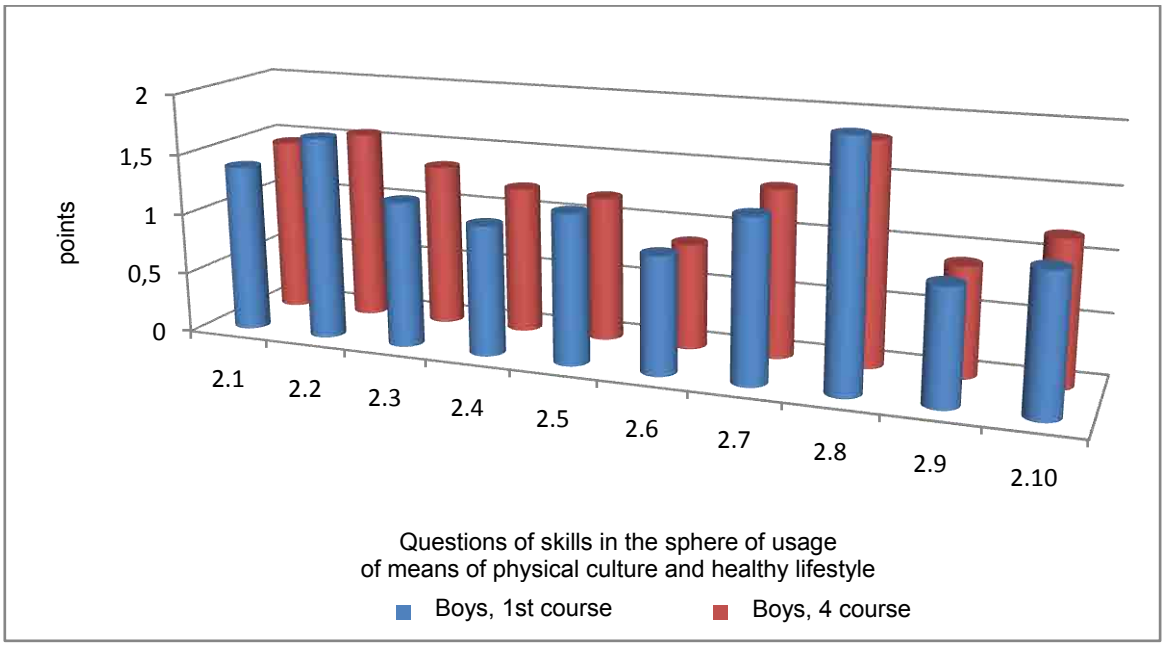

Fig. 1. Generic data of three universities boys' questioning about existence of abilities of usage means of physical culture and healthy lifestyle.

In fig. 1 and 2 is shown generic data, to which is evidently shown that students of first and fourth courses, both boys and girls, necessary for organization of sports-health exercises abilities and realization of self-control during exercises after the state of the organism are insufficient. The deficit of abilities touches those facilities of physical

culture that sharply needed for opening out physical culture activity and forming of healthy lifestyle. Thus, it is possible to assert that luggage of really important knowledge and abilities, being the condition of origin and perfection of physical culture activity prevents to it opening out.

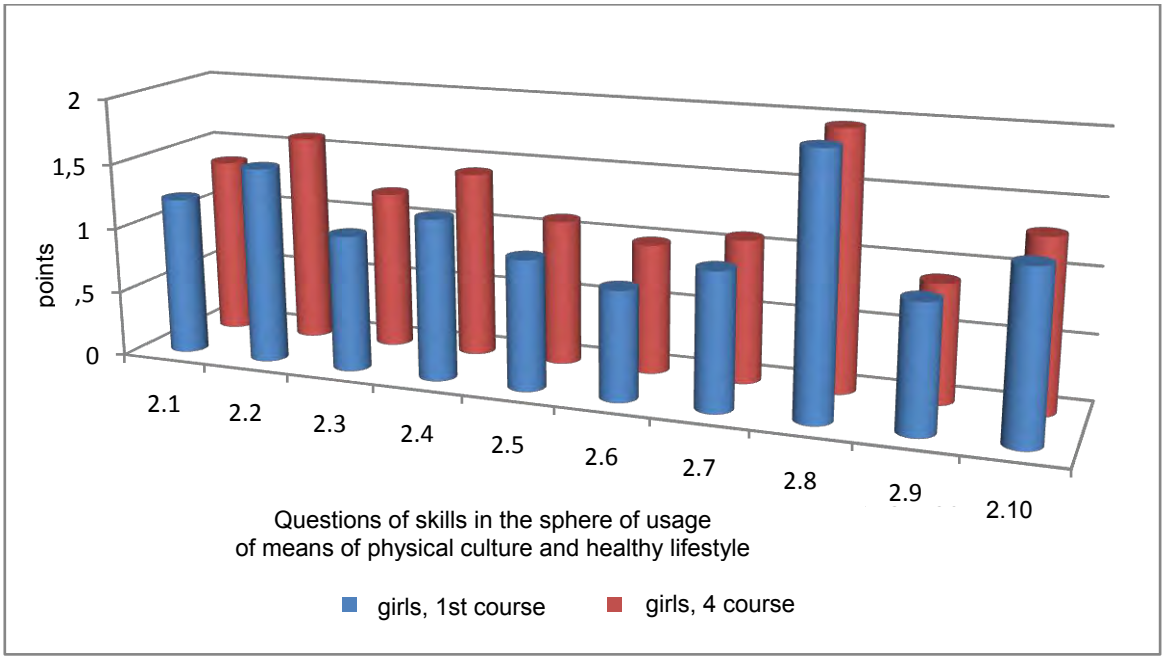

Fig.2. Generic data of three universities girls questionnaires about the presence of abilities of the use of facilities of physical culture and healthy lifestyle

The biggest quantity of points stays at positions 2.2 – at boys of first courses – 1,67 and fourth – 1,57, at girls – 1,5 and 1,6 points accordingly; and also 2.8 – at boys of first courses – 1,99, fourth – 1,82 points and at girls 1,95 and 1,96 points.

The minimal points, generically at boys and girls, get the following positions. At students of first course position 2.5 – the ability to define the volume of physical activity at engaging in physical exercises depending on sex, age, state of health – 1,23 and fourth courses – 1,1 points. At students (girls) of first courses position 2.5 – 0,99 and fourth courses – 1,1 accordingly. Position 2.6 – ability to define efficiency of engaging in physical exercises on a pulse, breathing, feel, indexes of physical development and development of physical qualities, at boys of first and fourth courses – 0,96 and 0,87 points. At girls of first courses – 0,83 and fourth – 0,99 points accordingly. Position 2.9 – ability to regulate the mental condition psychoregulation facilities – at boys and girls of first and fourth courses 0,99 points.

Conclusion.

1. Essential task of amateur physical culture education consists in that students form the first personal experience of the independent sports-health and recreational exercises, started under the direction of teacher that has own practice of sports activity and health building. Sense of amateur physical culture education of students consists in achievement a man of unity of mental and activity processes, necessary for estimation and understanding of the state of the health, programming and residence of healthy lifestyle. Or, otherwise speaking, forming creative personality of health builder.

2. During the analysis of getting results of research it is set that from ten positions in part of the present abilities presented in the questions of questionnaire, the most points among boys and girls of 1 and 4 courses, occupy positions 2.2 - ability to choose a place, sports suit and equipment depending on the type of physical exercises and 2.8 is abilities necessary for implementation of rules of the personal hygiene.

3. It is set that for students of 1 and 4 courses both boys and girls, abilities are necessary for organization of sport-health exercises and realization of self-control after the state of organism are insufficient. The deficit of abilities touches those facilities of physical culture that is sharply needed for opening out of physical culture activity and forming of healthy lifestyle.

4. It is possible to assert that luggage of really important knowledge and abilities, being the condition of origin and perfection of athletic activity and forming of healthy lifestyle, prevents to their opening out.

Perspective of following researches concern education of physical culture activity peculiarities and healthy lifestyle among students of Ukraine universities.

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SYSTEM OF ESTIMATIONS AND PROGNOSTICATIONS OF BODILY CONDITION OF SKILLED SPORTSMEN IN TRACK-AND-FIELD

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Annotation. The system of estimation and prognostication of bodily condition of skilled athletes is presented. The system includes the complex of pedagogical tests, evaluation tables, estimation of the functional state vegetative, nervous, cardiovascular systems, system of the external breathing. 436 sportsmen took part in research (212 women and 224 men). The analysis of electrocardiography is conducted, variability of cardiac rhythm, determination of vegetative balance, state of myocardium, violations of rhythm of heart, spirometric researches. The estimation of efficiency of activity of sportsman in extreme terms on the basis of type and properties of temperament, level of personality anxiety and estimation of psychological reliability of sportsmen is presented. The criteria of estimation of physical preparedness are certain, functional state of the basic systems of organism, influencing in a greater degree on achievement of high sporting results, psychological state of sportsmen.
Key words: estimation, state, preparedness, perfection, sportsman.

Introduction.

For the first years of independence sportsmen of national team of Ukraine on track-and-field conquered 17 medals of different dignity (4 – 7 – 6) on XXI championship of Europe (Helsinki, 27.06 - 1.07.2012). The representatives of record medals became representatives of almost all disciplines in track-and-field: race – Julia Olishevskaya, Olga Zemlyak, Natalia Pigida, Alina Logvinenko (relay 4x400 m, rank first), Maria Remen (200 m, rank first), Olesya Povkh (100 m, rank second), Kristina Stuj (200 m, rank second), Ljudmila Kovalenko (5000 m, rank second), Svetlana Shmidt (3000 m steeplechase, rank third), Olga Skripak (10000 m, rank third), Anna Mischenko (1500 m, rank third), Anna Yaroschuk (400 m the hurdles, rank third), Stanislav Melnikov (400 m the hurdles, rank third); jump – Olga Saladukha (triple jump, rank first), Sherif El-Sherif (triple jump, rank second), Elena Holosha (high jump, rank third); throwing – Vera Rebrik (javelin throwing, rank first), Natalia Semenova (discus throwing, rank third); combined events – Aleksej Kasyanov (decathlon, rank second), Ljudmila Iosipenko (heptathlon, rank second) [http://uaf.org.ua/ua/component/content/article/40-uanews/8878---qq--.html. www.european-athletics.org/european-athletics-championships-2012]. On XXX Olympic Games Ukrainian athletes conquered three medals: silver medal conquered Alexandr Pyatnitza in javelin throwing, two bronze medals – in triple jump Olga Saladykha, in relay race 4x100 m among women (Olesya Povkh, Kristina Stuj, Maria Remen, Elizaveta Bryzgina) – four race fourth, one fifth and two second races.

Successful performance of national team on XXI Europe championship grounds to consider that the track-and-field in Ukraine got the new impulse of development, constrained as with perfection, reconstruction and building of new sport bases in such cities as, Yalta, Donetsk, Kyiv, so by the results of long-term researches, started in early 2000 with sportsmen by a reserve command of country that today made greater part of the national olympic combined team on track-and-field, taking part in XXX Olympic Games in London [1, 2, 6].

Sport result in track-and-field depends on a quality management preparation of sportsmen, plugging in itself methodically correctly the worked out training macro-, mezo-, microcycles of preparation and rational distribution of training facilities during one educational-training exercise, but also from organization and realization of the centralized educational-training sessions, system of sportsmen feed, grant of restoration services, regular events sent to the estimation of different parties of preparedness of sportsmen (operative, current, stage control). The complex scientifically-methodical providing of sportsmen of high class is the major factor of increase of efficiency of the system of preparation of national team of Ukraine on track-and-field [4, 7, 8].

Nowadays one of basic directions of scientific researches in track-and-field is perfection of estimation of physical condition, plugging the estimation of physical preparedness, functional state of the basic systems of organism, psychological preparedness of sportsmen [3, 8 − 10]. However it is not enough to limit physical condition on the modern stage of development of theory and methodology of sportsmen preparation in track-and-field for a management by the training process of high qualification sportsmen, that induces to the search of new ways of decision of problem of prognostication of performance results, racing places on basic disciplines, success of sport career of athletes. This direction actively began to develop the employees of complex-scientific group at the beginning of 2000 in the reserve combined team to the Ukraine national team on track-and-field [1]. As practice showed, it is necessary to conduct the estimation of physical condition of athletes, that must plug in pedagogical testing (complex of exercises composed before, approved, informative, infallible, through that it is possible to define not only the level of development of different motive qualities and capabilities, but also predisposition of sportsman to certain specialization), monitoring of the functional state of cardiovascular and vegetative nervous systems of organism (electrocardiogram, different approaches to the analysis of variableness of cardiac rhythm: mathematical, spectral, structural-linguistic and other) and psychological state [2]. During researches in less degree it was notices to possibility of prognostication development of physical qualities, sport result, duration and success of performance during all sport career of athlete to 30 - 40 years

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old. The necessity of development of the system of high-efficiency prognostication of success of performance for responsible competitions and duration of stay in optimal sport form does not cause a doubt and is a pressing question in preparation of high class sportsmen. Developed system of estimation and prognostication of physical condition, successful performance on competitions will allow to perfect the system of selection of sportsmen in the national track-and-field teams of country for participating in the competitions of different level.

The article was done according to SRW of National University of Physical Education and Sport of Ukraine.

Aim, tasks, materials and methods.

Aim of research – perfection of the system of evaluation and prognostication of skilled athlete physical state on the basis of development of estimation criteria of physical preparedness, functional state of cardiovascular system and psychical reliability of competition activity of sportsmen.

Methods and organization of research. Analysis of scientifically-methodical literature and generalization of sport advanced experience; analysis of competitions protocols; anthropometry, dynamometry; pedagogical testing; psychological testing; spirometery; electrocardiogram; methods of mathematical analysis of variableness of cardiac rhythm with the use of diagnostic automated complex "Cardio+", methods of statistical treatment of results. The program "ORACLE" allows to carry out the multilateral analysis of electrocardiogram, deeply estimate the parameters of variableness of heart rhythm, diagnose violation of heart rhythm, operatively to define the level of the functional state.

Technology of realization of estimation of physical condition level consisted in pedagogical testing of sportsmen, interpretation of the obtained data of testing - determination of physical preparedness level, and also estimations of the functional state of sportsmen organism on the basis of drawing on the diagnostic automated complex "Cardio+", of estimation of the psychological state of sportsmen.

Researches passed in three stages. On the first stage (September 2004 – February 2005) was conducted a theoretical analysis and generalization of the special scientifically-methodical home and foreign literature on issue of estimation of physical condition of sportsmen of different specialization [6].

On the second stage (from March 2005 to September 2011) is conducted methodology of estimation of runners' physical condition on short and middle distances, worked out methodology of estimation of physical preparedness of the athletes specialized in running on short, middle and long distances, in long jumps, high jump, with a pole and triple jump, javelin-throwings, disk, hammer, shotput, combined eventsand heel-and-toe walk, and also introduction and approbation of these methodologies in the system of sportsmen preparation of national and reserve teams of Ukraine. The estimation of sportsmen physical condition was conducted during educational-training sessions in Yalta and Evpatoria in spring-summer and fall-winter setup times of circannual cycle on the stages of preparation to the higher achievements, maximal realization of individual possibilities. In testing took part 436 sportsmen (212 women and 224 men of sport qualification of Candidate in Master of Sports, Master of Sports).

On the third stage (October 2011 – March 2012) is conducted perfection of methodology of physical condition estimation, development of algorithm of realization of estimation of the functional and psychological state of skilled athletes and approbation of it in the system of preparation of sportsmen reserve and national teams of Ukraine.

Results.

In the process of done work was worked out methodology of athletes' physical condition estimation specialized in running on short and middle distances, of sport qualification from II rating to Master of Sports. Methodology was developed taking into account leading requirements – sport qualification, specialization of sportsmen, stage of preparation, where they are, availability and informing of the offered components of methodology of estimation. In methodology was used test exercises assisting all-round estimation of physical preparedness level of sportsmen taking into account specialization, pedagogical testing was also used in a complex with the accessible methods of estimation of sportsmen functional state of organism (portable apparatus through that it maybe to inspect plenty of sportsmen in the field terms). Methodology of physical condition estimation of the sportsmen of different qualification, specialized in running on short and middle distances, plugs in complex of pedagogical tests, evaluation tables, model indexes of variableness of heart rhythm, determination of type of the vegetative adjusting of cardiac rhythm and classification of the functional states of the sportsmen of different qualification, specialized in running on short and middle distances (fig .1).

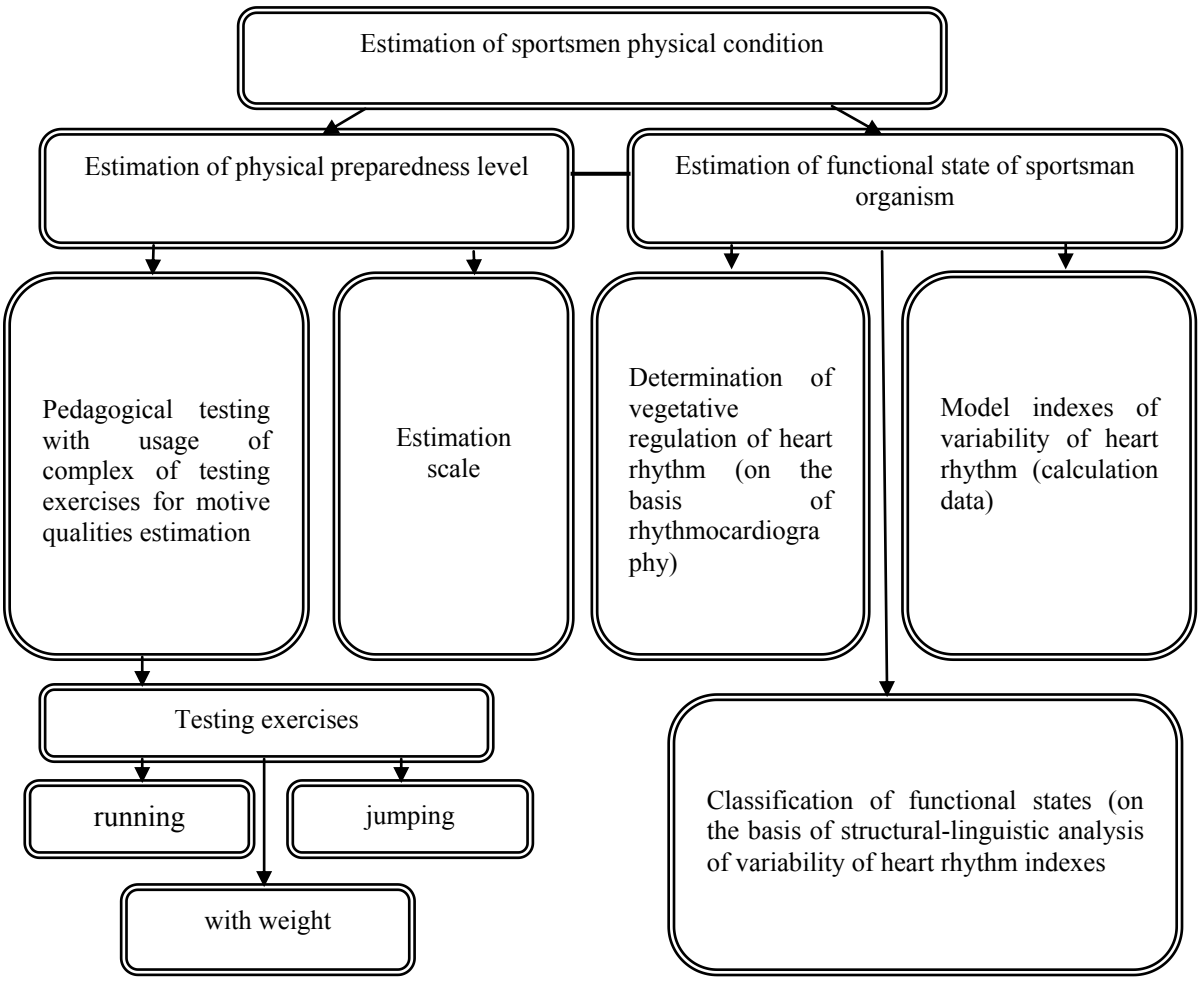

Fig. 1. An outline of methodology of physical condition estimation of skilled athletes – members of reserve national team of Ukraine on track-and-field, applied during 2007 − 2011 during an inspection [6].

Offer methodology is single for runners on short and middle distances of sport qualification from II digit to Master of Sports, however test exercises, the estimation criteria of both physical preparedness and functional state differ. Evaluation tables settled accounts taking into account a sport digit. Mathematical analysis of variableness of cardiac rhythm, on the basis the determined type of the vegetative adjusting of cardiac rhythm, conducted in a state of rest, to the forthcoming loading, after the day of rest. Classification of the functional states was conducted to loading, in a state of rest and after the standard test loading. The model indexes of variableness of cardiac rhythm settled accounts taking into account sport specialization and qualification of runners (in a state of rest, after loading).

Methodology of estimation of physical preparedness of different qualification athletes that well went approbation and introduction in the system of preparation of skilled athletes was also worked out (fig. 2).

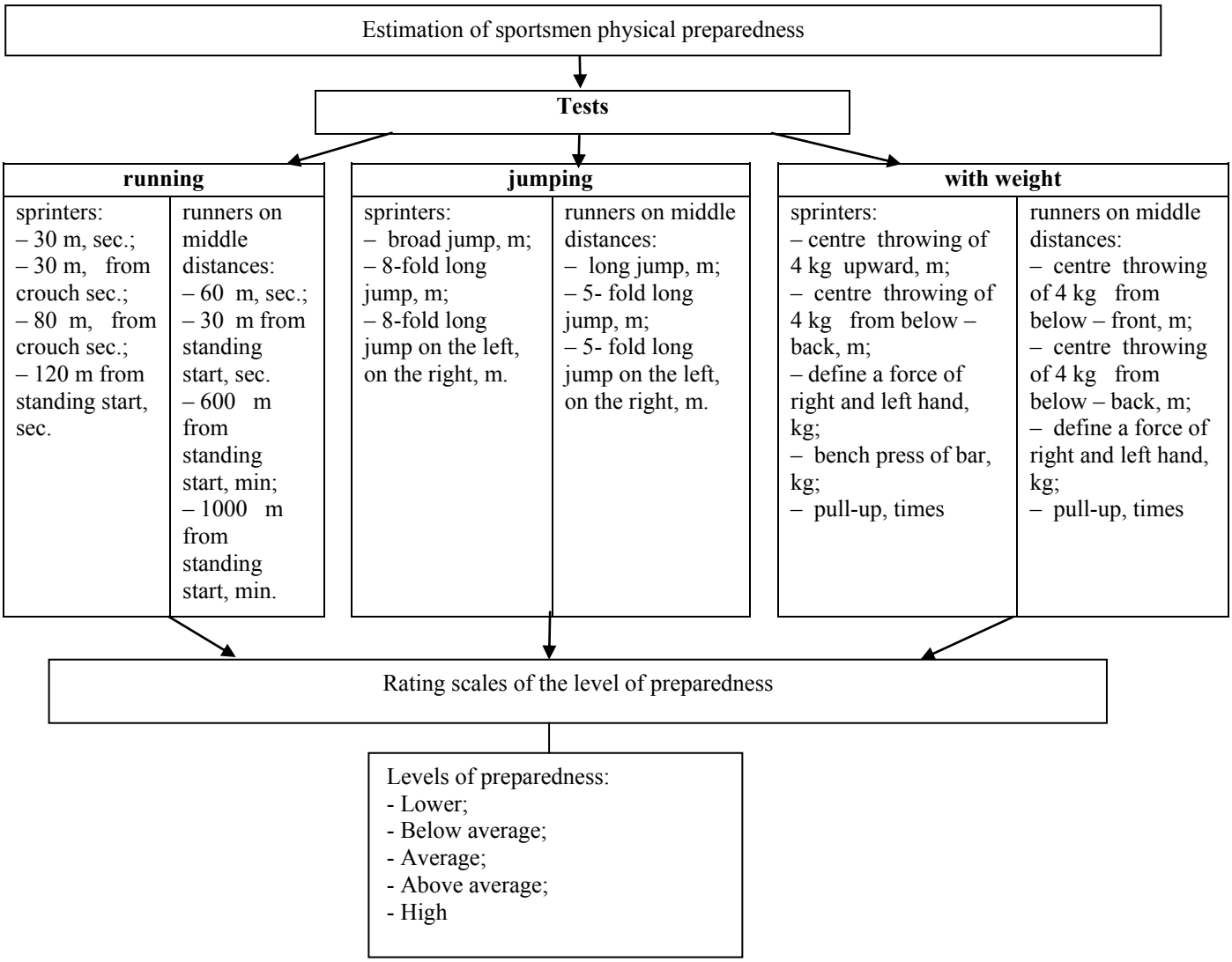

Fig. 2. The scheme of assessment methodologies of physical preparedness of qualified athletes (on example of runners over short and medium distances)

The proposed method of evaluation of physical preparedness of athletes introduced into the system of preparedness of athletes of reserve Ukrainian team in athletics was used for years 2007 - 2011. The developed method of evaluation of physical preparedness allows on the basic stages of preparation to identify a reserve of athletes who can achieve high results and then keep it at a later stage, to determine the athlete's predisposition to a particular discipline of athletics, carry out the selection of athletes to the national team. Efficiency of the method was confirmed by the results of athletes' performance in international competitions of different levels - I Junior Olympic games, match plays, World Championships, European Championships among juniors, young men, youth [1, 2, 6].

Despite successful testing and confirmation of the effectiveness of the developed system of assessing the physical condition of athletes of different qualification in modern conditions of athletes' preparedness require finding ways to improve the system, which include in its fundamental structure methods that allow to obtain reliable information about functional status of the leading systems of the body athletes (autonomic nervous system, cardiovascular system, respiratory system). The need to diagnose the psychological state is also clear, in that earlier do not pay enough attention. It is known that training and competitive activities of athletes accompanied by great mental strain. The effectiveness of the athlete activity in stressful situations depends on the type of temperament, personal anxiety and mental safety of athletes. It is also time to review and correct methodology for assessing physical preparedness, enabling tests to assess coordination abilities, expanding criteria for evaluating preparedness of athletes (Fig. 3).

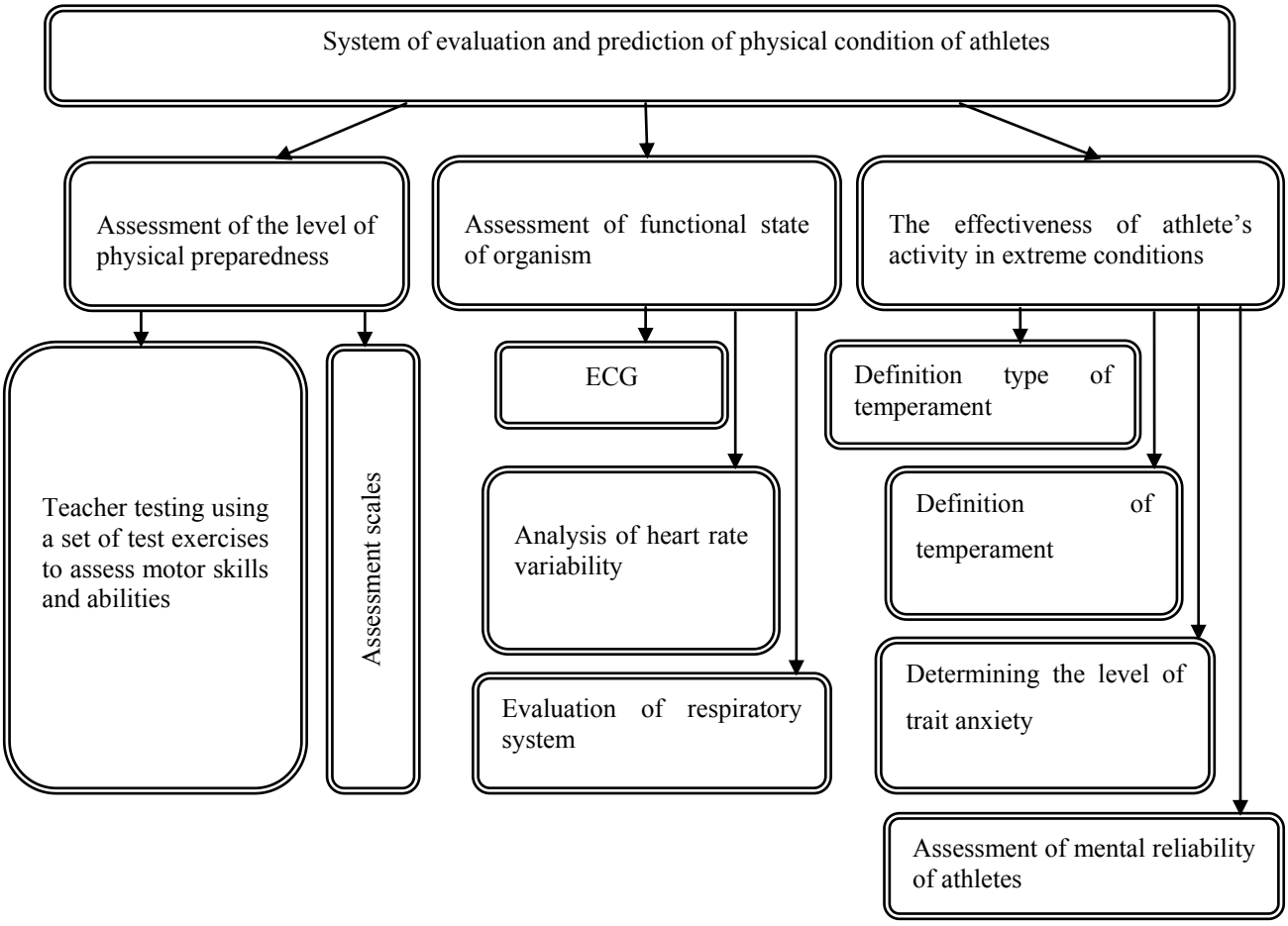

Fig.3. The scheme of assessment and prediction system of physical condition of qualified athletes - members of the reserve team of Ukraine on athletics applied from October 2011

Shown in Fig. 3 evaluation and prediction system of physical condition has a number of advantages over the system previously developed and presented in Figure 1, - more broader present component "Evaluation of the functional state of the body", and also included a completely new feature - "The effectiveness of the athlete's activity in extreme conditions" .

The first component in the evaluation and prediction system of the physical condition of qualified athletes at the stages of specialized basic training and training to the highest achievements – "Evaluation of physical preparedness", including test exercises: running, jumping, lifting weights, on coordination, and evaluation criteria in the form of evaluation scales and the degree of expression of physical preparedness from the maximum percentage (Fig. 4).

The application of developed methods of assessing physical condition of qualified athletes allows comprehensively evaluate the athlete - to determine the level of expression and development of high-speed, speed-strength, power, coordination abilities, special endurance, intermuscular and intramuscular coordination with accessible, informative tests, and carpal dynamometry (the reliability of each exercise proved mathematically). A number of used in the method exercises is equal to 19, regardless of specialization and skill athletes. In addition to assessing the level of development of physical abilities can predispose an athlete to determine the specialization of athletics, to predict successful performance in the upcoming competitions, identify leaders, and on this basis to equip the team to participate in high-level competitions.

The second component in the evaluation and prediction system of the physical condition of qualified athletes is "Evaluation of the functional state of the body" including the assessment of the cardiovascular system, the autonomic nervous system and the respiratory system through the use of automated diagnostic complex "Cardio +" (Fig. 5).

Method of evaluation the functional state of qualified athletes using the computer program "Multimode Cardio1" (manager, developer and co-workers - PhD I.A. Tchaikovsky, PhD in physical education and sports, professor V.I. Bobrovnik, PhD in physical education and sport, associate professor E.V. Krivoruchenko) first developed for athletes taking into account sports specialization and integrated into the software of the complex functional diagnosis "Cardio +" in the form of the "ORACLE". The technique involves an integrated assessment of autonomic regulation on the basis of heart rate variability, state of the myocardium based on full analysis of amplitude and time parameters of the electrocardiogram analysis of cardiac rhythm disorders. The "ORACLE" includes a comprehensive assessment of

the cardiovascular and autonomic nervous systems (criteria of evaluation are designed to sports specialization and qualification of athletes).

The third component in the evaluation and prediction system of physical condition of qualified athletes is "The effectiveness of the athlete in extreme conditions", which includes psychological testing (Fig. 6).

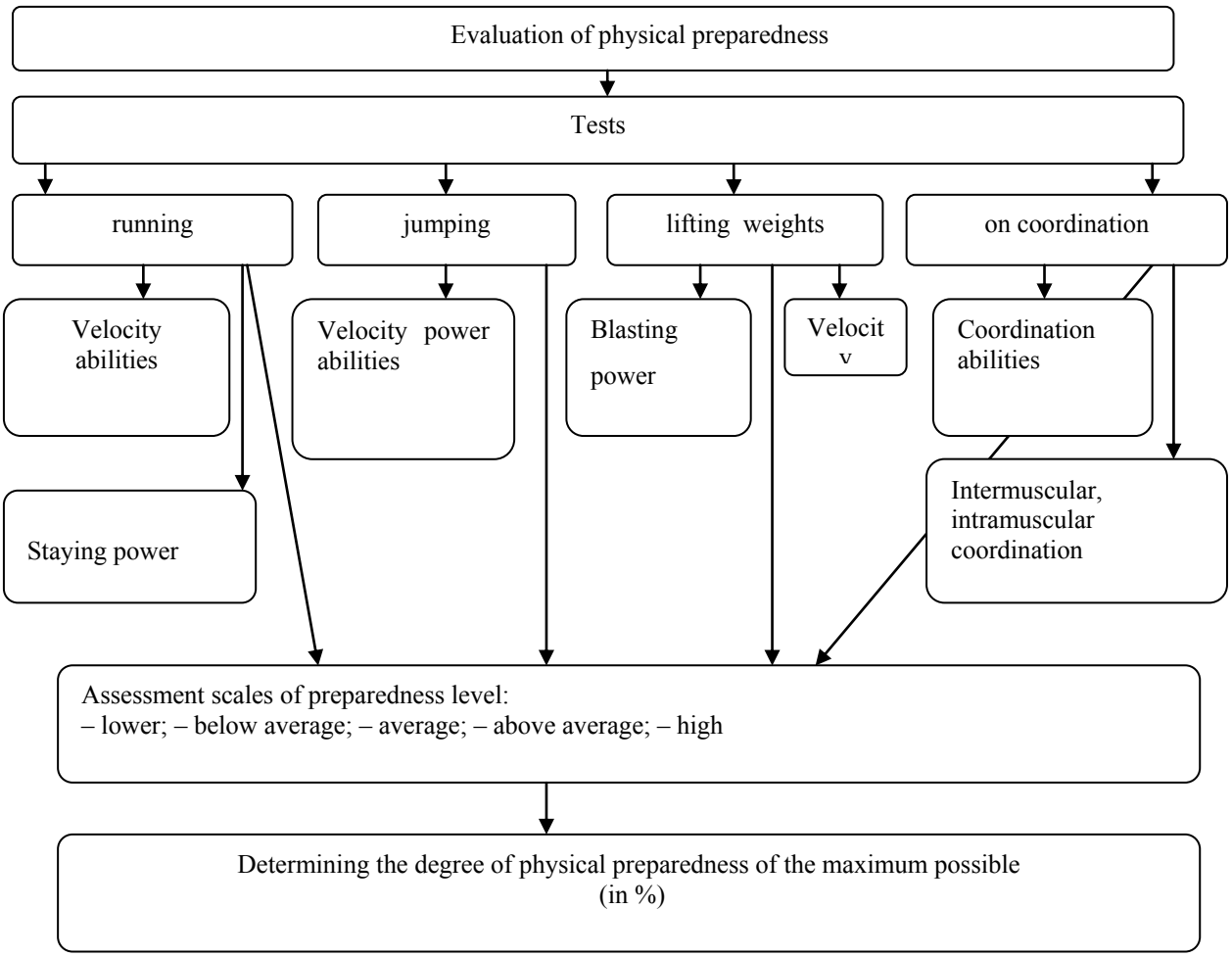

Fig. 4. The scheme of the evaluation system of physical preparedness of qualified athletes - members of the reserve team of Ukraine on athletics applied from October 2011

The efficiency of competitive activity of athlete depends on the type of temperament, level of personal anxiety and mental reliability of athlete. Temperament is the biological basis of personality, and based on the properties of the nervous system - the power of excitation and inhibition, and mobility of nervous processes, balance the nervous system [5]. However, it is not enough data about temperament to predict the success of competitive activity, you need more information about the structure of temperament. Used in the evaluation and prediction system of the physical condition of qualified athletes survey "Study of the psychological structure of temperament" by B.N. Smirnov reveals a number of polar properties of temperament: extraversion – introversion, emotional irritability – emotional balance, the rate of reactions (fast - slow), activity (high - low). In order to study the mental reliability of athletes used the methodic developed by V.E. Milman, to characterize the level of competitive emotional stability, competitive motivation, stability, noise immunity and self-regulation.

The current direction of scientific research in the development of the evaluation system of physical condition of qualified athletes is relevant and promising, that is confirmed by the use of long-term results of the study to predict the performances of athletes of reserve Ukrainian team in athletics at major forums of a year and achieve high results.

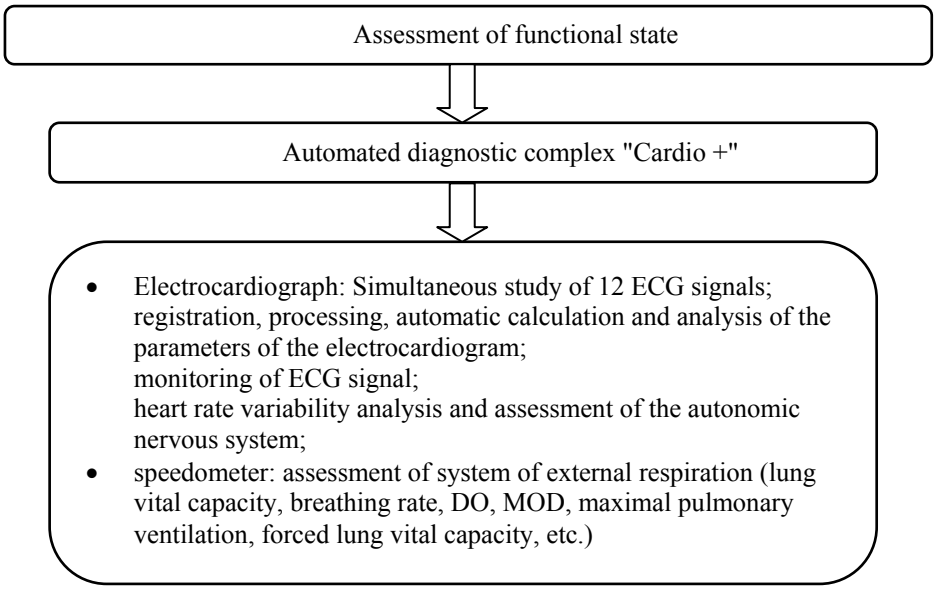

Fig. 5. Methods of assessing the functional state of qualified athletes - members of the reserve team of Ukraine on athletics applied from March 2011

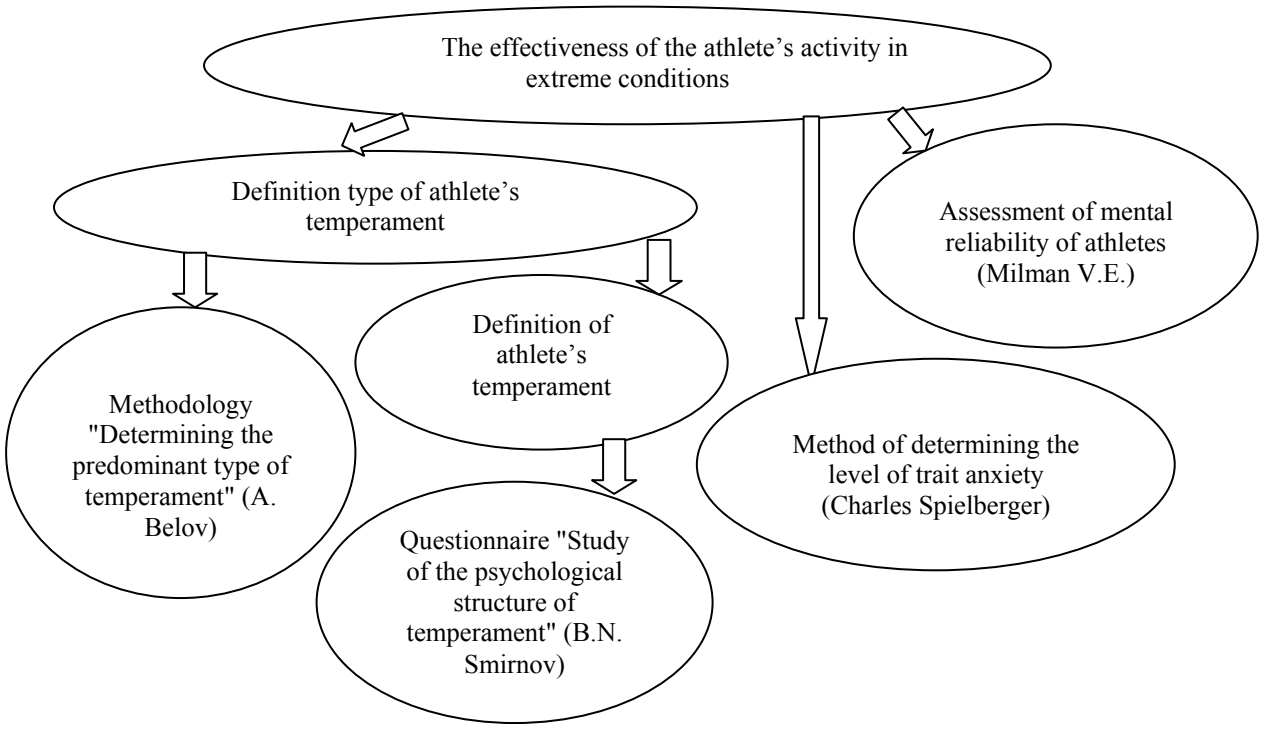

Fig. 6. Scheme for evaluating the effectiveness of the athlete in extreme conditions

Conclusion.

1. The main directions of development of research activity in the assessment and prediction of the physical condition of athletes qualified for specialized stages of basic training, preparation for records, the maximum realization of individual opportunities.

2. Developed groups of educational tests and criteria of assessment of physical ability development used for evaluation of physical preparedness, and to determine the athlete's predisposition to specialize in athletics.

3. Developed and tested in training process of qualified athletes method of functional diagnostics of major body systems that impact more on achieving high results. For a more accurate prediction of competitive activity of qualified athletes developed a method of psychological assessment. Developed a system for assessing and predicting the physical condition of qualified athletes, which includes a set of pedagogical tests, scorecards, assessment of the functional state of the autonomic nervous system, cardiovascular system, respiratory system by analyzing the ECG, heart rate variability, the definition of autonomic balance, state of the myocardium, cardiac arrhythmias , spirometric

studies, and also evaluation of effectiveness of the athlete's activity in extreme conditions by determining the type and properties of temperament, level of personal anxiety and psychological evaluation of reliability of athletes.

Prospects for future research are to determine the level of physical preparedness and functional status of qualified athletes by implementing evaluation systems and predict the physical condition of athletes in the training process.

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FEATURES OF OPPOSITION OF OFFENDER AND WORKER OF MILITIA UNDER VARIOUS CONDITIONS

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Annotation. An analysis and generalization of knowledge of features of origin and motion of situations of the armed collision of employees of law enforcement authorities and offenders is conducted. 82 workers of practical subdivisions of internal affairs organs took part in research between workers, who have already necessary to clash and detain criminals with a plain weapon. Canvassed on the specially developed questionnaire. It is set that for the workers of militia the insufficient level of the special theoretical knowledge of features of conduct of offenders and abilities of determination of degree of danger is formed. The aggregate of factors, influencing on a decision-making by an offender in relation to attacking militiaman is certain. It is found out that on a decision to accomplish an attack determining influence is rendered by internal factors: psychological state of offender in the moment of collision, his preparedness and level of motivation.
Keywords: factors, worker, militia, armed, criminal, cold, weapon.

Introduction.

The problem of systematization of knowledge in relation to collision with the armed opponent in the real terms remains actual. It is explained by complication to expose to study an object research in the conditions of unforeseeableness and variety of displays of different factors. With the aim of increase of efficiency of specialists' preparation of a row of martial arts sportsmen [2, 4] conducted arrangements of theoretical and practical knowledge, that touch their preparation and behavior during implementation of various technical-tactful actions. Various methodologies of martial arts sportsmen preparation are worked out, that were based on knowledge of features of technical-tactful actions depending on behavior of opponent. However, these researches were conducted in the conditions of sport collisions. Not enough attention applied on systematization of knowledge in relation to behavior of the armed and aggressive designed opponent during the real collisions, situational factors were not taken into account etc. Transference of knowledge from a sport theory and practice in the area of contradiction of subject-subject activity in the conditions of risk can not arrive at the positive effect.

Terms that arise up during the real collisions with an offender differ from sport collisions. Different appropriateness about opponent behavior, that accordingly require the presence of the special theoretical knowledge, practical abilities and skills from a worker, and also development of the special qualities.

Generalization of knowledge about criminal behavior during a collision with the worker of militia was conducted by other authors [1, 5]. But they did not investigate motivational, preparatory, motive-behavioral descriptions that are pre-condition of attacking worker of militia.

With the aim of improvement methodology of preparation of future law-enforcement to activity in the conditions of opposing with the armed offender it is necessary to systematize knowledge in psychology of person behavior; knowledge about opponent behavior in the moment of implementation of preparatory motions before an attack; knowledge that touch the external display of choice of actions at a collision with the worker of militia etc. For the increase of efficiency preparations it is necessary that a student capture system of knowledge about the sequence of own executions depending on the degree of danger. On the basis of the purchased knowledge future law-enforcement will have the opportunity to build and correct own behavior, taking into account the actions of opponent.

Realization of such direction becomes possible on condition of transition from breaking up to integral perception of knowledge that is accompanied to generalizations of constituents that touch behavior of offender.

An article is done according to до зведеного плану НАВС за темою "Basic directions of scientific researches of National academy of internal affairs for years 2010-2012".

Aim, task, material and methods.

Aim of work – to work out peculiarities of offender's behavior in conditions of face to face with a worker of militia.

Tasks:

1. to generalize knowledge about peculiarities of offender's behavior in conditions of face to face with a worker of militia;
2. to conduct questioning of workers of law enforcement authorities, that yielded to the attack of the armed opponent in the real terms;
3. to define and classify factors that influence on a decision-making to accomplish attacking worker of militia by an offender.

Methods of research. Theoretical analysis and generalization of literature sources, pedagogic observation,

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questioning.

Results.

The analysis of situations of the armed collision of workers of militia and offenders shows that in many cases law enforcements could not in time and for certain to define further behavior of deferred. It is explained by that they owned an insufficient measure by the system of knowledge in relation to behavior of offender and actions that was preceded to the attack depending on external terms, presence of weapon and motivational factor.

By scientists [3, 5] it is well-proven that behavior of person in most cases is determined by a motivational factor, but external terms have influence here. Depending on their combination and degree of display, a person behaves differ. It touches also behavior of offender in situations that is preceded to the contact with the representative of law.

With the aim of research of features of offender's behavior was questioned workers of internal affairs organs (IAO), that face to face with armed and aggressive designed persons (n=82). A questionnaire consisted of 20 questions that touched the terms of the armed collision, variants of development of collisions, external display of actions and motivation of offender in relation to an attack.

On the results of questionnaire it is set that for transgressor to decide to attack worker of militia influences a row of internal (75,7%) and external factors (24,3%) (fig. 1). Totality of external factors is represented on fig. 2. In their composition can be distinguished two groups. The first group – controlled factors, that the worker of militia on the basis of knowledge can correct his actions for achievement advantages in terms that is preceded to the armed collision. The second group is situational or out of control factors: part of day, luminosity of place of collision and weather terms; presence and type of weapon; distance between worker and offender at the moment of collision; time of the visual passing at the beginning of collision.

The analysis of results of questionnaire showed that behavior of offender depends on external terms (luminosity, weather terms) and part of day. It is set that almost at 60% situations they operate in the conditions of darkness. Darkness influences not only on psychological firmness but also on a motive process on the whole. Scientists [1, 5] notice that during a collision with a criminal in such terms law enforcements operate uncertainly and, even, confusedly. The weak directivity in unusual terms is accompanied by a speed of reaction, exactness of motions loss [1, 6-10]. The terms of darkness cause psychological and muscular tension that in turn influences on firmness of implementation of passing ahead or protective actions. Timeliness of the motive reacting in the conditions of darkness almost on two orders below, than on the lighted up locality [1, 4]. In 68% cases, workers collide with criminals in the conditions of darkness, they succeeded to disappear. On this occasion V.I. Plisko (2008) marks that part of day is a basic factor, that influences on the dynamics of development of situations that pop up.

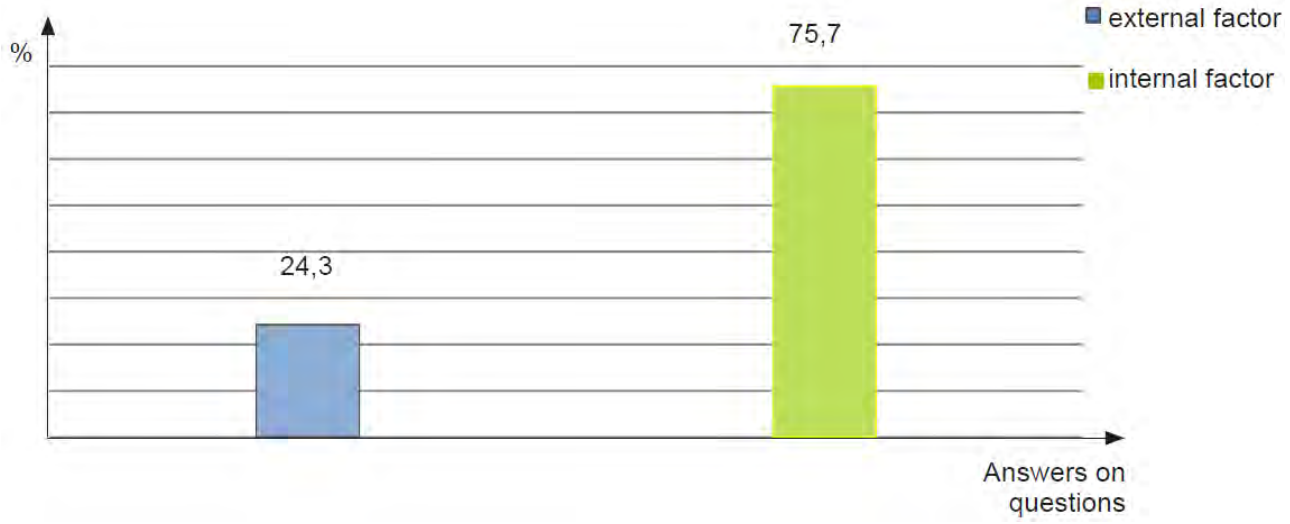

Fig. 1. Answers on questions "What factors have the biggest influence on making a decision by offender to attack a militia worker?"

It is set that the actions of offender in relation to attack are determined sometimes visual passing at the beginning of collision (28,6%), by distance between opposing parties in the moment of attack (42,1%) and distance on that a collision took place with the worker of militia (29,3%). Depending on combination of data of constituents, in one cases a violator tries to disappear (67,4%), in other – attacks (32,6%). At pursuit on the result of collision the level of physical preparedness of opposing parties influences considerably (87,6%). If opponent can not disappear, then depending on the level of motivation, presence of weapon, he attacks (46,5%) or obeys (53,5%). If in the moment of collision the amount of workers of militia exceeds numeral, then an offender watches steps, tries to disappear, attacks in case of pursuit. If the amount of offenders exceeds, then they conduct himself more confidently. At the presence of obvious aggression from the side of violator, worker must try not to provoke a person to the attack.

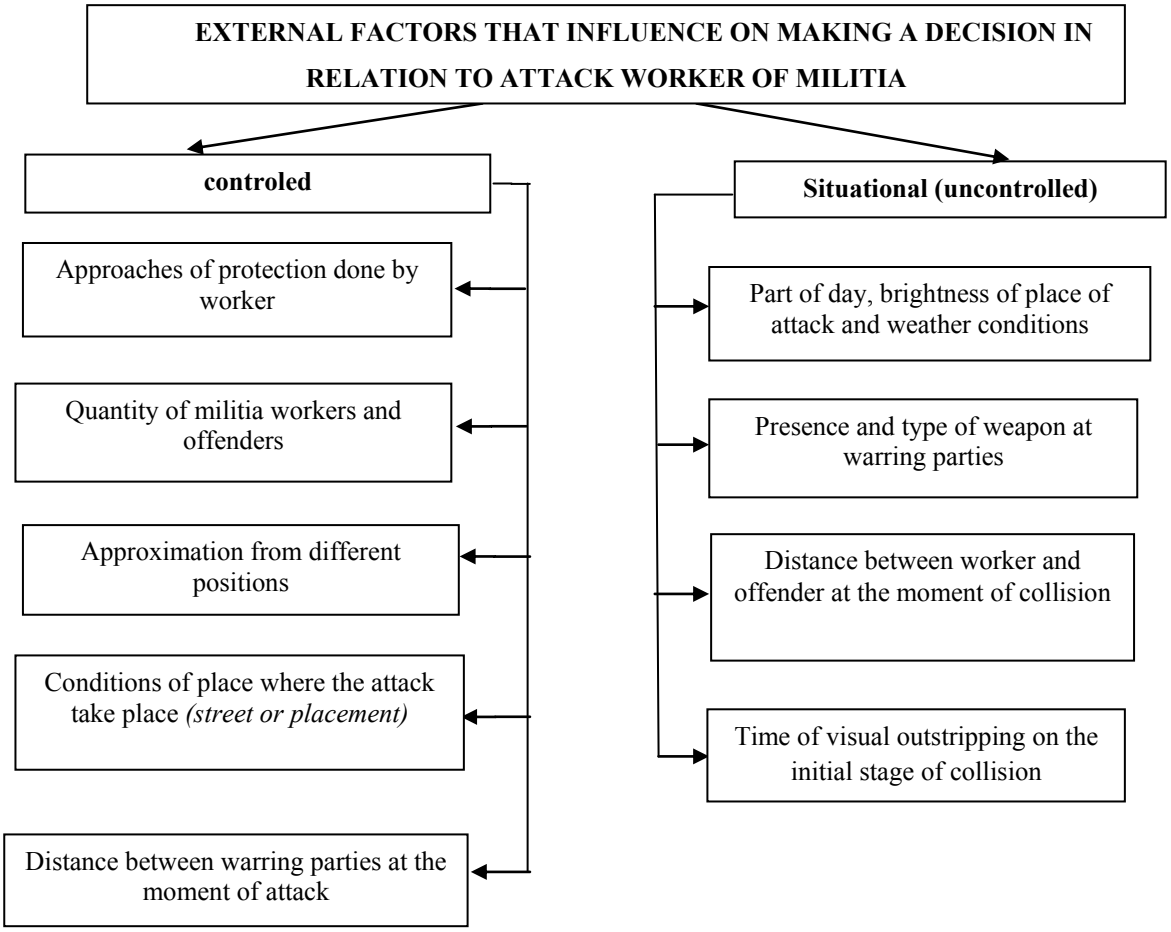

Fig. 2. Totality of external factors that have influence on behavior of offender during a collision with the worker of militia

The questionnaire of workers of militia, that during implementation of official duties collides with the criminals armed cold steel, showed that on making decision to accomplish attack qualificatory influence rendered by internal factors (75,7%) (fig. 3). Among their totality can be distinguished three basic blocks: the psychological state of opponent in the moment of collision; preparedness of opponent; level of motivation.

On the psychological state of offender influences external evidences of law enforcement preparedness (52,7%) and number of attacks (47,3%) with the worker of militia. Preparedness of law enforcement indicates execution of preparatory motions that preceded to protective actions – self-control or increase of distance, acceptance of advantageous position location in relation to a suspicious person, reaching of weapon and etc.

In the moment of collision with the worker of militia offender estimates external conditions and reaction of law enforcement by sight, here he takes into account the possibilities for the receipt of advantage in case of collision, that influences on development of own psychophysical qualities and forming of abilities and skills of implementation of receptions of attack with the use of cold steel.

It is set that the orientation of person to implementation of unlawful act is determined by a motivational factor (88,3%), and then conditions where the action take place (11,7%). Depending on the type of the accomplished offence, possible psychical violations, persuasions or action of pharmacological substances, motivation of opponent will differ in relation to an attack.

Motivation that induces offender to the attack has different character, but, mainly, it is offender's meeting with law enforcement that brings to his further detention and threat of receipt of punishment. As a result, during the visual fixing of appearance of militia worker, he makes a decision in relation to a way out of such situation. If law enforcement did not educe this person or not paid attention to his appearance, then in such cases offender tries to disappear. If militia worker fixed a suspicious person by sight and began to approach to him, then offender makes decision to further actions. An analysis of researches on psychology [3] shows that maintenance of reason of actions and behavior of person will always remain just individual and unique. The questionnaire of workers of practical subdivisions allowed to distinguish constituents that influence on the process of motivation of offender to the attack: threat of detention and receipt of punishment (61,4%); possibility to disappear (22,7%); possibility to settle a situation on the benefit using a weapon (8,9%); presence and type of weapon of parties of opposing (4,8%); psychical violations

and persuasions (2,2%).

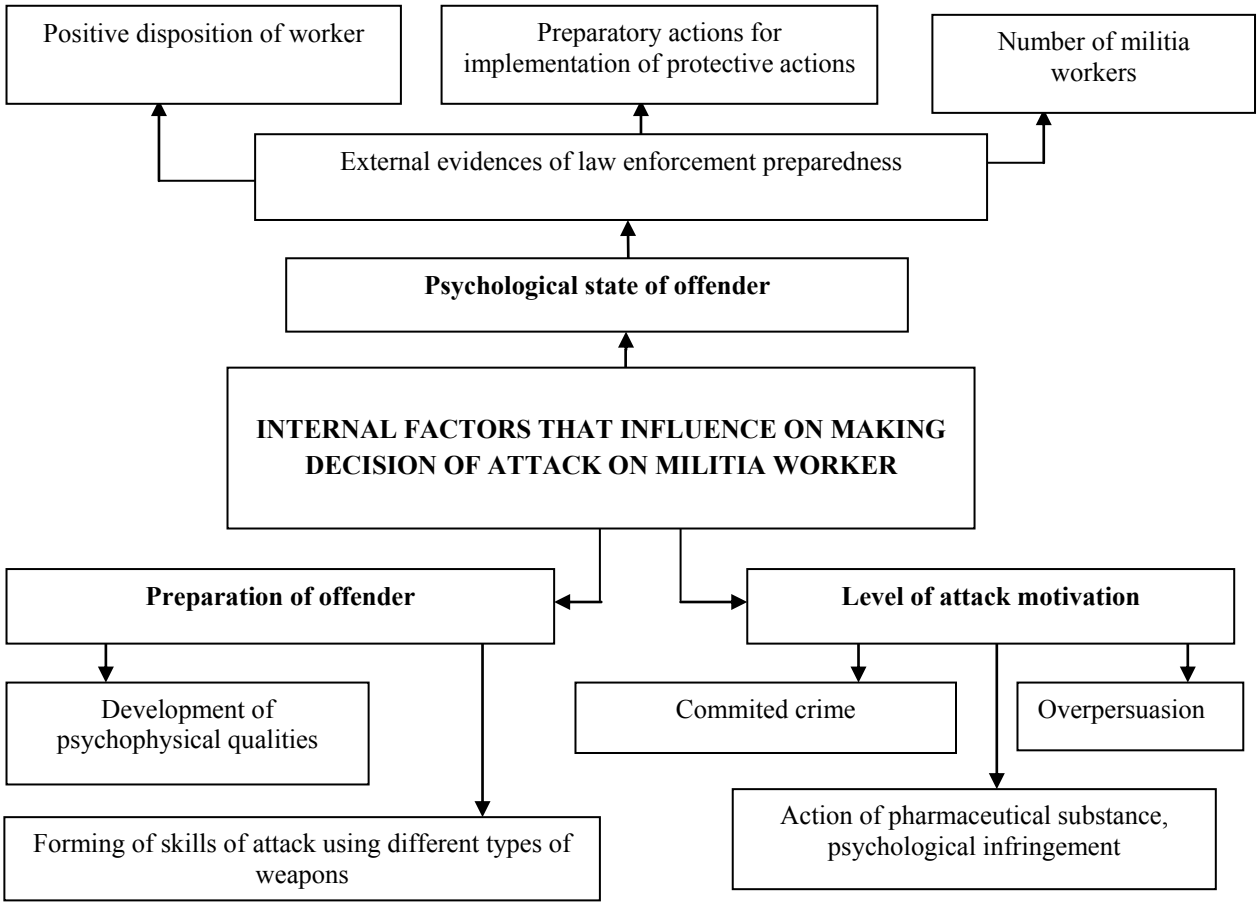

Fig. 3. Totality of internal factors that make an influence on offender's behavior during collisions with militia worker

Making decision to accomplish the armed attack outwardly represented as certain successive behavior-motive, sentinels and emotional descriptions. There is a possibility to forecast the actions of suspicious person and build the sequence of own protective executions having knowledge of conformities of displaying of these characteristics with taking into account external factors.

On results of questionnaire it is found out, if the suspected at once made decision to attack, then depending on his mental condition and tactical intentions two basic variants of development of the armed collision are possible. In one cases he does not show aggressive intentions, and then, in qualified to it moment, reaches a knife and executes a blow (59,7%). Greater probability of origin of opportunity, when militia worker is inattentive and distracted. Dangerous moments also arose up in situations, when worker did not react on reduction of distance and ignored a position location. Even at presence of shooting-iron law enforcement not always had time to apply it even through sentinel limitations.

In another cases offender attacks at once without reflections (40,3%). Aggressive behavior from the side of criminal sometimes is the consequence of psychical violations or action of different pharmacological substances (drugs, alcohol). In such state a person is able to accomplish an expressive attack. At the sufficient level of preparedness, a worker has possibility on external signs to forecast beginning and method of attack and accordingly to react.

Notice that to every certain situation it is necessary to befit differentiated, to take into account both external conditions and motivation opponent and spatio-temporal parameters, preparedness of forward and factor of surprise. Analysing these components, law enforcement correct own actions and makes decision in relation to the use of events of physical influence and rendering of offender harmless.

Conclusion.

On the basis of analysis of the special literature and questionnaire of workers of organs of internal affairs were found out the features of behavior of opposing persons during their collision under various conditions. It is set and shown the totality of external and internal factors that influence on the making decision to attack by the opponent. External factors: the factors controlled by a worker, and situational (out of control) factors. Certainly, that on a making decision to accomplish attack qualificatory influence is rendered by internal factors: the psychological state of offender in the moment of collision, his preparedness and level of motivation.

Prospects of further researches. It is envisaged to ground and work out the situational models of behavior of offender during a collision with the militia worker.

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FEATURES OF METHOD OF MEDICAL PHYSICAL CULTURE AT INSUFFICIENCY OF AORTIC VALVE

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Annotation. The basic approaches are considered to application of facilities of medical physical education at aortic insufficiency on the stages of physical rehabilitation. An analysis is conducted more than 20 literary sources. The mechanisms of medical action of physical exercises are specified - restorative influence, forming of temporal indemnifications, trophic action, normalization of the broken functions. It is set that task, forms, facilities, the methods of medical physical culture depend on the degree of weight of disease, degree of cardio-vascular insufficiency and stage of physical rehabilitation. Engaged in a medical physical culture conducted in form morning hygienical gymnastics, medical gymnastics, independent employments, dosed walks, walking on steps, mobile and sporting games. It is marked that sparing training and training the motive modes are instrumental in the gradual training of the cardio-vascular system. Recommended the dosed walking to lead to a to 5-8 km on the sparing training and to 8-12 km on training modes.
Keywords: physical, rehabilitation, лечебная, aortic, valve.

Introduction.

Pathology of aortic valve meets in 30-35% of sick with vices valves of heart, and on frequency of defeat a rheumatic process an aortic valve occupies the second place after mitral. Life-span of patients, even at the expressed aortic insufficiency from the moment of establishment of diagnosis is usually more than 5 years, and in halves - even more than 10. A prognosis gets worse with joining of cardiovascular insufficiency. Medicamental therapy in these cases is usually ineffective. Life-span of patients after appearance of heart failure - about 2 years [1, 4, 7].

Treatment of patients with aortic insufficiency is complex and includes conservative therapy (treatment of chronic heart failure), surgical treatment, physical therapy treatment, exercise therapy (ET), work therapy, massotherapy, climototherapy [3, 8, 12, 19-22]. The contents of different aspects of rehabilitation at aortic insufficiency, and also aim and task of practical realization of rehabilitation events are base on general organizational principles: early beginning of approaches, staggered functions sent to renewal; continuity of process of rehabilitation; complex character of rehabilitation events; individual going near determination of the program of restoration treatment depending on the initial level of bodily condition, features of flow of illness, personality of patient, profession etc. [5, 6]. But existent methodologies of ET at this pathology do not take into account the degree of cardiovascular insufficiency, that accompanies the flow of disease, and degree of weight of aortic insufficiency.

The work is done according to SRW of Kharkiv state academy of physical culture.

Aim, task, material and methods.

Aim of work – to consider main approaches to usage of means of ET at aortic insufficiency on stages of restorative treatment.

Results.

At insufficiency aortic valve is used the three stage system of rehabilitation: hospital, sanatorium (local rehabilitation center), policlinic. For the stage-by-stage chart of rehabilitation it is characterised continuity and succession phase-to-phase rehabilitation [6, 9].

Exercise therapy, as a method of treatment, has a row of features, the main of which consists in that for a fight against violations of hemodynamics for insufficiency of aortic valve of heart is used the basic function of organism - function of motion. ET is not only pathogenetic method of therapy, but also functional, assisting prevention of development of heart failure at aortic insufficiency and proceeding in the staggered function of myocardium.

By the basic mechanisms of action of physical exercises at aortic insufficiency is neuroreflectory and neurohumoral. From these positions it is possible to distinguish four basic directions of curative action of physical exercises at aortic insufficiency: restorative, trophic action, forming of temporal indemnifications, normalization of the broken functions [10, 12].

Restorative action of physical exercises shows up activation of motor-visceral reflexes. Under the influences of physical exercise it is decrease, and sometimes psychogenic cortical inhibition take place. In these cases cortex is partly confined streams of natural irritations that goes from the receptors of working muscles and joints that affects on its functional state.

In the reactions of organism patient on physical exercises it is necessary to take into account participation of psychical sphere. Positive emotions that arise up at employments of ET stimulate physiological processes in the organism of patient, at the same time distract it from the sickly experiencing.

Under the act of physical exercises the tone of cortex of cerebral hemispheres is rises up, mobility of nervous process is accelerated, equalization of inhibition and excitation correlation take place, that is weak or break through pathological impulsing. Gradually promoting the dosage of physical exercises, it is succeeded to perfect broken illness and

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hypokinesia co-ordination in process of cardiovascular, respiratory and other systems of organism. The reactions of the cardiovascular system on muscular work become adequate to loading.

The positive operating of physical exercises on *trophic processes* is explained by their stimulant influence on circulation of blood and exchange processes. As a result of muscular activity coronal arteries are broaden, circulation of blood increases, the amount of functioning capillaries increases in myocardium. Physical exercises that are long-run used, assist to development of microcirculation, activate the oxidation-reduction processes in myocardium, reduce maintenance of cholesterol in blood, liquidate the consequences of ischemic and hypoxias of myocardium, stimulate gradual strengthening and improvement of retractive ability of myocardium. In addition, improvement of metabolism in organism on the whole, and in a heart in particular, as a result of stimulation of oxidizing processes results in proceeding in the endocardium damaged as a result of inflammatory process (infectious endocarditis).

There are development and perfection of *compensatory processes* that improve circulation of blood due to extracardiac factors during employments in ET. Physical exercises assist the acceleration of forming of compensatory mechanisms and promote their full value, help to develop vicarian adaptations. Applying physical exercises at insufficiency aortic valve, it is succeeded lasted to save retractive ability of myocardium, compensate work of heart in the changed terms of circulation of blood.

Under the act of exercises elasticity of arteries rises, the large number of reserve capillaries opens up, that provides the acceleration of current of blood and improvement of blood supply of fabrics. Under the act of physical exercises in muscles accumulates power substratum (ATP, glycogen) and their expense diminishes, tone of veins rises and venous circulation of blood is accelerated. The rhythmic change of reductions and weakening of skeletal muscles (“muscular pump”) assists moving of blood toward a heart. The improvement of circulation of blood is helped by breathing. Intrathoracic pressure goes down at inhalation, a stick action of chest increases, the greater complete of filling of cavities of heart by blood during a diastole take place. It provides the greater systole volume of blood. Abdominal pressure rises at inhalation, that, from one side, strengthens the current of blood towards a heart, on the other hand - increases the amount of circulatory blood due to her "squeezing-out" from a liver and spleen. At exhalation blood in great numbers comes in an abdominal region from lower limbs. Motions in joints also accelerate the current of blood on veins. All these extracardiac factors of circulation of blood compensate weakening of function of myocardium aught.

Usage of physical exercises in the stage of recovery provides *normalization of functions* of the cardiovascular system and rehabilitation of patient, that is achieved by the gradual and careful training that strengthens myocardium and improves it retractive ability, proceeds in vascular reactions on muscular work and change of body position. Physical exercises improve the function of regulative organs, their ability to coordinate work of cardiovascular, respiratory and other systems of organism during physical activities. Thus, ability to execute the large volume of work rises. The special respiratory exercises with lengthening of exhalation and reduction of breathing frequency reduce frequency of heart beats. Exercises in weakening of muscles and for shallow muscular groups reduce tone of arteriole and reduce peripheral resistance to the current of blood [10, 13, 16].

Medical exercises at insufficiency aortic valve is used with the aim of stimulation auxiliary factors of circulation of blood, tissue breathing, training of vehicle of the external breathing, development of indemnification of cardiovascular insufficiency and promotes: general training of all organism, adaptation to physical activity, increase of tone and capacity of patients; making of arbitrary management breathing at peace and during muscular work at patients, arbitrary weakening of muscles, co-ordination of motions [15].

Methodology of employments of ET at insufficiency aortic valve depends on the degree of insufficiency of circulation of blood. Exercises in ET at insufficiency aortic valve conducted in form of morning hygienical gymnastics, medical exercises, independent exercises, dosed walks, walking on steps, movable and sport games taking into account the motive mode, where a patient is, degree of insufficiency of circulation of blood.

On the hospital stage of rehabilitation of patients with insufficiency aortic valve is used four motive periods: strict bed rest; ambulation; free rest. At a outpatient department – sparing, sparing-training and training regime [6, 12].

At *insufficiency of circulation of blood of III of degree (strict bet motive rest)* activity of patient limits sharply, auxiliary motions, acceptances of meal, rest room come true by means of medical personnel; ET is used only during stabilizing of insufficiency of circulation of blood and in a period intensive treatment at the improvement of the state sick. Medical exercises are sent to warning of possible complications; stimulation of indemnifications; improvement of the psychoemotional state of patient.

Correctly neat exercises do not bother, but, vice versa, facilitate work of heart, because they activate the extracardiac factors of circulation of blood. To such exercises belong active motions for shallow and middle muscular groups. Motions in the large joints of extremities are executed with incomplete amplitude, with the shortened lever, sometimes by means of ET’s instructor or passively. Exercises for the muscles of trunk are used only as turns on a right side and small tricking into of pelvis. Static respiratory exercises are executed without deepening of breathing. Exercises are executed in a slow rate, from initial position, lying on a back (with heaved up the head of a bed). Amount of repetition: for large joints - 3-4 times, for shallow - 4-6 times. Exercises combine with easy massage of shins. Methodical pointing: exercises for hip and knee joints can be executed with the small help of instructor. Feet can not be torn away from a bed. Motions in hip and humeral joints are executed in turn by every extremity. Initial position for all exercises – lying on a back, with the brought head of a bed, hands along a trunk. At this degree of insufficiency of circulation of blood is used the severe bed motive mode.

At *insufficiency of blood circulation of II degree* ET exercises direct on warning of possible complications; improvement of peripheral circulation of blood; liquidation of the stagnant phenomena; improvement of metabolic process in myocardium and endocardium; a grant of the easy general tonic operating on an organism that promotes the functions of all his systems (including central nervous and endocrine).

On exercises are used curative gymnastics (CG), morning hygienical gymnastics (MHG) and private lessons.

ET exercises are conducted in position, lying with highly heaved up head of bed. Exercises are used for the small and middle muscular groups of extremities with large muscular effort, executable in a middle rate, with a limit amplitude; dosage – 8-10 times. Respiratory exercises of pectoral type are used with the prolonged exhalation.

At *insufficiency of blood circulation of II B degree (lying mode)* the tasks of ET are providing of more prudent function of myocardium due to the improvement of peripheral circulation of blood and utilization of oxygen fabrics; decrease of high pressure in the small circle of blood circulation; activation of function of extracardiac mechanisms of blood circulation; development of indemnification of blood circulation; making of the correct breathing of pectoral type with the prolonged exhalation.

The lying mode is characterized active behavior of patient in a bed, independent taking food and self-reliant getting sit then stand. Methodology of ET, mainly, reminds methodology at the heart failure of III degree - the amount of reiterations of motions increases only in shallow joints (to 8-10 times); respiratory exercises are executed with lengthening small strengthening of exhalation that in a greater degree improves a venous outflow and improves peripheral circulation of blood.

Exercises begin to be used for the muscles of trunk that is executed with incomplete amplitude, amount of reiterations - 3-4 times. Initial positions - lying and sitting. For the improvement of motion of the ORP processes in employment the pauses of rest join at the complete weakening of muscles. Duration of exercises - 10-15 min; closeness of exercises - 40-45% of general time.

ET exercises at *insufficiency of blood circulation of II A degree (ambulant motive regimen)* there is an adaptation of the cardiovascular system to the changed terms of blood circulation; improvement of ventilation of lungs and utilization of oxygen by fabrics; strengthening of myocardium and increase of him retractive ability. It is recommended private CG and MHG lessons. ET exercises are conducted in initial position, lying, with highly heaved up head of bed, sitting and standing (limit). Simple for co-ordinations exercises are used for overhead and lower extremities, with moderate muscular effort, executable in a slow and middle rate, with complete amplitude; amount of reiterations - 8-10 times. Elementary exercises are used also for the muscles of trunk without the expressed muscular effort, executable in a slow rate, amplitude of motions of trunk grows gradually (but it remains incomplete); dosage – 2-6 times. The dosed walking (1-5 min) is included in a middle basic part of exercise. Respiratory exercises of pectoral and mixed type are used with the prolonged exhalation, with the pauses of rest at complete weakening of muscles. Duration of exercises – 15-20 min; closeness of exercise – 50-60 % of general time.

All motions are executed in a concordance with breathing. Special respiratory static and dynamic exercises are executed with strengthening and prolonged to exhalation. Motions in large joints are executed in a slow rate, amount of reiterations - 4-6 times; in shallow joints - in a middle rate, amount of reiterations - 8-12 times. Initial positions – lying, sitting and standing. At the improvement of the state sick a task gradually used to adapt him to physical activities that increase gradually. Physical exercises become complicated, amplitude and rate of motions increase. The amount of repetitions of exercises for large muscular groups increases to 10-12 times.

At *chronic insufficiency of blood circulation of I degree and during the period of recovery without breach of blood circulation* is appointed *the free motive mode*. The basic task of ET is adaptation of the cardiovascular system and all organism of patient to domestic and productive physical activities; training of the cardiovascular system and all organism with the aim of proceeding in a physical capacity, strengthening of myocardium, activation of peripheral circulation of blood; making of the correct breathing is at walking, getting up and lowering on a stair. It is recommended CG, MHG, dosed walks. Engaging in a curative gymnastics exercises include exercises for middle and large muscular groups, exercises with objects (by gymnastic flails, balls), with small burdens (by dumb-bells, by the printed balls weighing 1-1,5 kg) and with resistance; not mobile games, playing tasks; different walking, of short duration at run in a slow rate.

Motions difficult for co-ordinations are executed with complete amplitude. These exercises alternate with exercises for the shallow muscular groups of extremities and with respiratory exercises. All substantive initial provisions are used: standing, sitting and lying. Simple for co-ordinations exercises are used for all muscular groups with moderate muscular effort, executable with complete amplitude; dosage - 12-16 times. Respiratory exercises of static and dynamic character of moderate depth are used with the prolonged exhalation; the pauses of rest are included at the complete weakening of muscles. Training in walking on steps (getting up and lowering) in a middle of basic part of exercise. Duration of exercise - 20-35 min; closeness of exercise - 50-70 % of general time [12, 16].

At *the compensated state* tasks of ET there is training of the cardiovascular system and organism on the whole due to gradually growing physical activities.

The sparing motive mode is appointed to patient with the policlinic and sanatory stage of physical rehabilitation. By the nature executable physical exercises no so differ from those that are used at the free mode of permanent establishment. On the sparing mode is used the dosed walking, distance of which to the end of course of treatment increases to 2-3 km. Movable games of moderate intensity are used.

Training motive regime is appointed to patients in the stage of indemnification of disease on the policlinic and sanatory stages of rehabilitation.

Sparing-training and training motive modes assist the gradual training of the cardiovascular system. Intensity of implementation of physical exercises rises. The dosed walking is about 5-8 km on sparing-training and 8-12 km on training modes. Some sport games, elements of sport (rowing, skiing, etc.), near tourism are used.

At application to the patients with insufficiency aortic valve ET it is necessary to build so that the physical loading did not exceed their functional possibilities. It is impossible to overload a sick heart even during proof indemnification, but needed to want a method the dosed physical training to develop and perfect the conformable mechanisms of the system of circulation of blood on the whole [6, 10].

Conclusion.

Treatment of patients with aortic insufficiency is complex and includes conservative therapy (treatment of chronic heart failure), surgical treatment, physical therapy treatment, curative physical culture, work therapy, massotherapy, climototherapy.

ET exercises at insufficiency aortic valve conducted in form of morning hygienical gymnastics, curative gymnastics, independent exercises, dosed walks, walking on steps, movable and sport games and others taking into account the motive mode, where patient is, and degree of insufficiency of blood circulation.

Perspective is further research of methodologies of curative physical education at the combined defects of heart.

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FEATURES OF MEDICAL FEED AT SACCHARINE DIABETES

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Annotation. The basic approaches are considered to application of medical feed at saccharine diabetes. An analysis is conducted more than 30 literary sources. It is set that a dietotherapy is obligatory for all of patients saccharine diabetes and allows to obtain his indemnification more than in third of cases. It is marked that at saccharine diabetes of the I type it is necessary basis of diet to count the severe observance of time of reception of meal, constancy of its composition and amount. At diabetes II type a substantial value is acquired by achievement and subsequent support of ideal mass of body. It is set that basic modern principles of dietotherapy at saccharine diabetes is: physiological composition of carbonhydratess (55-60%), fats (20-25%) and albumens (15-20%); calculation of power value of day's ration taking into account mass of body, age, floor, power charges; exception from the diet of the refined carbonhydratess which are easily mastered; a feed must be a shot; severe mode of distributing of power value of day's ration and sacchariferous value of meal on an amount and clock of reception of meal.
Keywords: saccharine diabetes, dietotherapy, feed, meal, carbonhydratess.

Introduction.

A dietotherapy (DTh) continues to remain the basic method of treatment of diabetes mellitus. It is obligatory for all patients without exception with a diabetes mellitus (DM) and allows to obtain its indemnification more than at third of cases. In connection with absence of etiotropic therapy of diabetes mellitus the only real prophylactic measure of origin and development of vascular complications on the modern stage is maximal indemnification of various metabolic violations peculiar to this disease [6, 9]. Dietotherapy assists not only of decreasing of arterial pressure, but also can decrease possibility of risk of progress of coronal heart trouble due to it lipid falling effect [2, 3].

Regardless of etiology, duration and character of motion of DM the necessary condition of effective treatment of patients is inhibition by them physiology diet that envisages coverage of all power charges depending on character of labour activity [1, 4, 5]. DTh helps to attain complete normalization of metabolism for patients on DM, it must assist the offensive of good feel, support of capacity, normal development of children and teenagers, patients on DM, to normal motion of pregnancy for women and increase of life-span [8, 10, 21].

Violations of diet result mostly to the increase of dose of sugar falling preparations, sometimes the basis of insulin and sulphonamide resistance, accompanied by development of obesity [11, 12]. Rough errors in a diet conduce to proof decompensation of DM, assist early appearance and rapid progress of diabetic angiopathy and row of chronic complications of DM [17].

At setting of curative feed do not take into account concomitant pathology and complication of basic disease, not enough attention attend for prophylaxis and correction of dysl-epidemic [15]. There is not single diet through the necessity of account of power charges, ideal mass of body, dose of sugar lowering preparations and concomitant diseases weight.

Work is done according to plan of SRW of the Kharkiv State Academy of Physical Culture.

Aim, task, material and methods.

Aim of work - to consider the basic approaches to application of dietotherapy at a diabetes mellitus.

Results.

With the aim of reduction of level to glycemia, content of lipids in the serum of blood, reduction to surplus of body weight for patients with a diabetes mellitus is used a diet with moderate limitation of carbohydrates and complete exception of the refined sugars with sufficient content of proteins that answer physiology needs of a man and fats [14, 19]. The food ration of patients is necessarily enriched by vegetables: cabbage, carrot, kidney bean, peas, beet; by fruit: red and white currant; rye bread, that consumed as a source of food fibres (from a calculation 18-25 gr on a day) [20].

DTh differentiates depending on the type of DM. Basis of diet at DM of 1 type can be strict regime of taking meals, and also constancy of its composition and amount. For warning of the hypoglycemia states expedient additional receptions of meal. At DM of 2 type substantial value is acquired by an achievement and further support of ideal body weight. In this time applied the automated calculation of diet to the patients on DM [24].

Main modern principles of DTh at DM are:

- - physiological component of carbohydrate (55-60%), fats (20-25%) and proteins (15-20%) [25, 29];
- a calculation of power value of day's ration with taking into account mass of body, age, sex, power charges weight;
- exception from the diet of the refined carbohydrates that is easily mastered;
- feed must be a shot: breakfast - 25% of day's calorie content, second breakfast - 10%, dinner - 35%, afternoon - 10%, supper - 20% [26];
- mode of distribution of power value of day's ration and sacchariferous value of meal after a number and to the o'clock of reception of meal [16, 30].

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An estimation of power balance, balance between the receipt of energy with a meal and its expense in the process of vital functions, is extraordinarily important. At the computer count of daily allowance energy consumptions of patients was set in permanent establishment, that at DM of 1 type even the moderate deficit of calorie content of meal does not allow to obtain satisfactory indemnification of metabolism. It is revealed that correlative copulas between efficiency of treatment of patients on DN of 1 type and individual energy consumptions and it is set that the moderate deficit of calorie content of meal is anymore unfavorable for motion of diabetes, than him moderate surplus [28].

The following tendencies can be single out in the development of DTh at DM for the last years:

I. Usage of dietary fibers (DF).

II. Usage of sugar substitute (SS).

III. Purpose of substances that reduce absorption of glucose.

I. Dietary fibers are contained in vegetables (cabbage, carrot, beet, kidney bean, peas etc.), berries (raspberry, red and white currant etc.), fruits, nuts and other plants. Their concentration in different food products varies considerably. The main therapeutic effects at using of DF by patients with DM are:

- decline of level of glycemia and glucosuria,
- reduction to content of lipids is in the serum of blood [18, 27],
- elimination of surplus of body weight at patients with the insulin-dependent type of disease [7, 23].

The presence of these effects allows to recommend the wide use of DF in the dietotherapy of patients on DM, especially there is an idea about the insufficient consumption of DF as factor of risk of DM of 2 type.

Near the decline of glycemia and glucosuria application of DF assists the improvement of indexes of glycated haemoglobin.

It is considered that healthy persons must consume about 30 g of DF every day, thus half from them - due to cereal products. At DM their dose also presents 18-25 g*of day^{-1}, maybe its increase to 40 g*of day^{-1}.

II. Sugar substitute are widely enough used in the dietotherapy of DM. Limitation of the use of the refined carbohydrates in a number of cases is difficult carried many by patients on DM. In connection with this 20-30% of patients can not survive the protracted exception of sugar substitutes from a food ration and systematic violate a diet. Most authors consider that high-calorie SS (sorbitol, xylite, fructose) must be appointed in a dose to 30 g on twenty-four hours [24, 26].

III. To the substances that reduce suction of glucose belongs acarbose – complex oligosaccharide of microbal origin. It detains suction of carbohydrates in bowels by inhibition ά- glucoside hydrolase as a result of which suction of sucrose increases that conduces to the decline to glycemia [26, 30].

Diet number 9 is used with the aim of conditioning for maintenance of positive carbohydrate balance, normalization of violations of carbohydrate exchange and prevention of violations of lipometabolism. In early 20th of XX century, watching patients, a professor M. Pevxner came to the conclusion, that diet with normal content of fats (to 100 g) and poor carbohydrates results in the gradual decline of body and normalization of carbohydrate exchange weight. It is find out that overweight depended, mainly, on the amount of consumable carbohydrates, but not fats, as considered before. On this principle is based all lowcarbohydrate diets appeared relatively recently. Thus, in basis of diet №9 principle of decline of calorie content of ration lies due to reduction of absorb carbohydrates. Undoubtedly advantage of diet №9 is balanced ration at that organism gets all the substances need to him. Content of carbohydrates is not so radically reduced, as, for example, in the Atkins protein diet (20 g). It means that diet №9 can be used long enough, unlike the above-mentioned diets [22].

Chemical composition of meal in diet №9 is balanced. Energy value – 2300 kcal. During the day organism gets about 100 g of proteins (60% of which are animal origin), 80 g of fats (25-30% of them are of vegetable origin with high level of polyunsaturated fatty acids, mass of 24 hour ration – to 30 kg, all meals are cooked and baked). Proposed to take meal not huge portions every 3-4 hour. Quantity of taking meals at diet №9 can rich 5-6 times per day, carbohydrates allocate all day; after the injection of insulin patient must take meal with carbohydrates.

Using this diet is necessary to eliminate easy-absorb carbohydrates from a ration, such as sugar, honey, cooking, vine, chocolate, raisin/pl, dried apricots, dried apricots, fig, candies, pastry wares and pleasures. It is allowed to use in a feed milk, lactate products, cheeses, cheese, sour cream, dairy and vegetable butter, meat of bird and fish (unfat sorts). In addition, the use of soup on low meat or fish broth with a small amount of vegetables, cereals, pasta, and dishes and side dishes of vegetables and leafy greens. You can also enter the diet of vegetables, containing no more than 4-5% carbohydrates, such as tomatoes, cabbage, zucchini, cucumbers, spinach, radishes and lettuce. Such vegetables as potatoes, beets, turnips and carrots are allowed to include in the diet of setting off the settled amount of carbohydrates. Bread is recommended to use mostly black, 200-300 grams per day. Should limit the use of pasta and flour products and cereals and other foods that contain carbohydrates. Sugar should be replaced sorbitol or xylitol to 20-40 grams per day (taking into consideration their caloric content). You can use fruits and berries, preferably sour or sweet and sour to 200 grams per day in raw form, as well as compotes with xylitol or sorbitol.

The main disadvantages of diet number 9 - is the need to prepare meals independently measuring the right amount of products and their counting, and its calories are little different from the usual diet, which requires adherence to a diet for a long time, patients with overweight.

Diet for each patient diabetes adjusted individually. In this case, there is no single diet because of the need to consider energy costs, ideal body weight, dose of hypoglycemic drugs and related diseases. Diabetic patients with concomitant diseases of internal organs prescribe combined diet. For example, if liver prescribe diet number 9/5, which limited fat to 60 grams, are excluded extractives and sweets [13].

In recent years, the publication of the application in diabetic patients, the so-called "free diet." This is achieved mainly through the introduction of the diet of patients with products that contain high amounts of carbohydrates. But "free diet" implies primarily the use of hardware insulin delivery systems that mimic physiological rhythm inkretsiyi hormone that allows us to achieve normoglycemia [2, 8].

Conclusion.

Diet for each patient with diabetes selected individually. The basic principles of the modern diet in diabetes are: physiological composition of carbohydrates (55-60%), fat (20-25%) and protein (15-20%); calculation of the energy value of a daily diet including weight, age, sex, energy costs, and exclusion from the diet of refined carbohydrates, easily absorbed, food should be fractional; strict mode of distribution of the energy value of the daily diet and sugar values of food and the number of hours of eating.

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INFLUENCE OF THE EXPERIMENTAL PROGRAM OF TRAININGS IN ARMSPORT ON THE POWER INDEXES OF BASIC MUSCLE GROUPS OF 16-17-YEARS-OLD ARMWRESTLERS

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Annotation. The features of influence of the experimental program of trainings are considered in armsport. The program is developed taking into account age-dependent changes in the organism of young sportsmen, features of development of force and power endurance, structure of long-term preparation. The program is directed on development of force and static power endurance of basic muscle groups of sportsmen. In researches took part 30 sportsmen aged 16-17 years old. It is set that the stage of the specialized base training is foreseen by the increase of time on perfection of technique of fight at the table to 15 %. The special attention must be spared the special physical youth development. The block of the specialized training to send to development of explosive force, workings of weak corners, change of character of work is recommended. It is set that trainings with the static loadings are obligatory and in the general volume of loadings must make no less than 20 %. It is necessarily necessary to plan the block of the restoration training for physical and psychological renewal of sportsmen after the conducted setup time and appearance on competitions, exposure and comprehension of sufferet errors and search of methods of their removal.
Keywords: armsport, macrocycle, static, endurance, force.

Introduction.

Modern arm wrestling has a power character, but in fact the manifestation of qualities is speed-strength sport. At the same time, the role of technical and tactical training to achieve results in competitions, approaching struggle. Thus, the idea of strength, speed-strength qualities directly linked with the fight on his hands.

For armwrestling, like all sports, is characterized striving for maximum achievement. Adding to senior figures in armwrestling implemented using appropriate construction of sports training, use of the most effective and efficient means and methods of deep long and year-round training [7-10, 13, 14].

In the scientific and technical literature, planning, programming training process taught in a discussion of options training athletes. Therefore, based on age-related changes in the body of young athletes, especially the development of strength and power endurance in them, the structure of long-term training of athletes proposed by V.N. Platonov [11] developed an exemplary program and the structure of long-term preparation of young arm-sportsmen. Based on the proposed structure of many training arm wrestlers and block training system designed experimental program training arm wrestlers on stage of specialized basic training.

The work is done according to SRW of Kharkiv state academy of physical culture.

Aim, task, material and methods.

Aim of work: to determine the impact of developed training experimental program for arm wrestlers aged16-17 years old on power and speed-strength performance.

Tasks of work:

1). based on the block system to offer a training plan of annual training macrocycle of arm wrestlers aged 16-17-years old;

2). to determine impact of the proposed program to the reaction of the motor vehicle in boys of 16-17 years old;

3). provide practical recommendations for training at the stage of basic training in specialized arm wrestling.

It was used the following methods: pedagogical methods (monitoring the training process, interviews with athletes, coaches poll, analysis programs of arm wrestling, registration performance, racing athletes compliance content of the training process), pedagogical experiment, the methods of mathematical statistics. In study involved 30 boys 16-17 years and for 15 in the control and experimental groups.

Results.

Based on theoretical and methodological development of Yu. Verhoshanskii about the features of a block system of training (2005), methodological recommendations of E. Usanov [12] and I. Belsky [6], according to the system of training in arm wrestling we developed experimental program [1-5] of training of 16-17-years old arm wrestlers. Annual program of training includes 5 blocks: 1 - block of prior training, 2 - block of basic training, 3 - block of specialized training, 4 - competitive block, 5 - block of recovery workout. Each block of training has characteristic for it structural, time, content and target characteristics.

Comparative analysis of the level of strength abilities of young arm wrestlers of control and experimental groups at the end of the experiment showed that significant positive changes in the functional state of the organism and the level of physical preparedness of young experimental group made it possible to achieve significantly high levels of strength and static endurance of arm wrestlers for major muscle groups - wrist flexors , forearm flexor, extensor forearms, trunk extensors and calf muscles.

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Thus, the rate of force flexor hands in the experimental group during the experiment increased by 13.4% (from 45.7 kg to 52.8 kg), while in the control group, the difference was 9.3% (up from 46.1 kg to 50.4 kg). The difference between data control and experimental groups significant ($p < 0,05$; $t = 2,24$) - Fig. 1, Table 1.

Power indicator flexor forearm of athletes of experimental group increased from 37.7 kg to 44.8 kg (difference 15.8%) and in the control group grew by 5.8% (from 38.4 to 42.3 kg). Intergroup difference strength of muscle groups was reliable ($p < 0,05$; $t = 2,25$) - Figure 1, Table 1.

The changes of force (Fig. 1) extensor forearm in both groups and between groups had a similar degree of change. Thus, in the control group power indicator of muscle groups changed by 9.2% (from 30.6 to 33.7 kg), while the experimental group of athletes - by 14.2% (from 30.8 to 35.9 kg). End intergroup indices differed significantly ($p < 0,05$; $t = 2,31$) - Table 1.

Table 1

Change of forces of investigated muscle groups in the experimental and control groups (September 2009 - July 2010)

№	Muscle group	Flexor of hand (kg)		Flexor of forearm (kg)		Extensor of forearm (kg)		Extensor of body (kg)		Calf muscles (kg)	
	Time of research / Group	September	July	September	July	September	July	September	July	September	July
1.	Experimental group	45,7 ± 0,81	52,8 ± 0,59	37,7 ± 0,84	44,8 ± 0,64	30,8 ± 0,78	35,9 ± 0,61	105,8 ± 1,33	114,5 ± 1,22	105,7 ± 1,76	116,9 ± 1,59
2.	Control group	46,1 ± 0,7	50,4 ± 1,81	38,4 ± 0,68	42,3 ± 0,91	30,6 ± 0.71	33,7 ± 0,73	106,7 ± 1,51	110,3 ± 1,38	106,9 ± 1,64	111,4 ± 1,73
3.	Reliability of changes	$p > 0,05$ $t = 0,37$	$p < 0,05$ $t = 2,24$	$p > 0,05$ $t = 0,98$	$p < 0,05$ $t = 2,25$	$p > 0,05$ $t = 0,19$	$p < 0,05$ $t = 2,31$	$p > 0,05$ $t = 0,45$	$p < 0,05$ $t = 2,28$	$p > 0,05$ $t = 0,50$	$p < 0,05$ $t = 2,35$

Table 1

Changing of static endurance of studied muscle groups in the experimental and control groups (September 2009 - July 2010)

№	Muscle group	Flexor of hand (s)		Flexor of forearm (s)		Extensor of forearm (s)		Extensor of body (s)		Calf muscles (s)	
	Time of research / Group	September	July	September	July	September	July	September	July	September	July
1.	Experimental group	116,7 ± 1,90	130,6 ± 1,72	134,2 ± 2,07	149,9 ± 1,68	110,3 ± 1,84	123,9 ± 1,58	113,8 ± 1,90	125,6 ± 1,74	200,7 ± 4,30	213,3 ± 3,81
2.	Control group	115,5 ± 1,81	120,2 ± 2,13	133,5 ± 1,93	143,3 ± 2,12	111,1 ± 1,96	117,3 ± 2,08	113,2 ± 2,20	119,7 ± 1,88	201,5 ± 5,26	206,9 ± 4,05
3.	Reliability of changes	$p > 0,05$ $t = 0,46$	$p < 0,01$ $t = 3,34$	$p > 0,05$ $t = 0,36$	$p < 0,05$ $t = 2,41$	$p > 0,05$ $t = 0,29$	$p < 0,05$ $t = 2,58$	$p > 0,05$ $t = 0,27$	$p < 0,05$ $t = 2,30$	$p > 0,05$ $t = 0,19$	$p < 0,05$ $t = 2,35$

Comparison of the power capacity of the trunk extensors between the studied groups showed that at the end of the experiment athletes of experimental group have significantly higher rate (35.9 kg instead of 33.7 kg) ($p < 0,05$; $t = 2,31$). Growth in the experimental group in percentage were two times higher than controls (7.6% instead of 3.4%) - Fig. 1, Table 1.

Power indicators of calf muscles at athletes of control group during the study increased from 106.9 to 111.4 kg (4.2%), and experimental - 9.6% (from 105.7 kg to 116.9 kg). The difference between groups was significant ($p < 0,05$; $t = 2,35$) - Fig. 1.

Conducted at the end of the experimental training program control test of static strength endurance enabled to state that the corrected plans of training at the stages of basic and specialized training allow significant increase of power endurance of athletes of different muscle groups of the experimental group (Table 1). So, flexor of hands a growth was 10.6%. Indicator of static strength and endurance of muscle groups increased from 116,7 ± 1,9 s to 130,6 ± 1,72 s. Control group of athletes in the growth rate of this indicator was 4.1%. In numerical terms it is - from 115,5 ± 1,81 s to 120,2 ± 2,13 s (Table 1). Intergroup difference was reliable - $p < 0,01$ at $t = 3,34$.

Dynamic of growth of power capacity flexors and extensors of the forearm had a similar trend foregoing changes. Thus, intergroup difference at the beginning of the experiment in these muscle groups are not significantly different ($p > 0,05$; at $t = 0,36$ and 0.29), and at the end of the experiment the distinction as in the first group of muscles ($p < 0,05$; $t = 2,41$), and in the second ($p < 0,05$; $t = 2,58$) was reliable (Table 1). In numerical terms, these indicators respectively equal: the flexor forearm - 149,9 ± 1,68 s vs 143,3 ± 2,12 s, extensor forearms - 123,9 ± 1,58 s vs 117,3 ± 2,01 s (Fig. 1).

Indicators in the trunk extensors at arm wrestlers of experimental group also differed by significant difference of growth ($p < 0,05$; $t = 2,30$) compared to the control group. Thus, the experimental difference between the groups was not significant (113,8 ± 1,90 s instead of 113,2 ± 2,20 s), and finally statistically different (125,6 ± 1,74 s instead of 119,7 ± 1 , 88 s) - Table 1, Fig. 1.

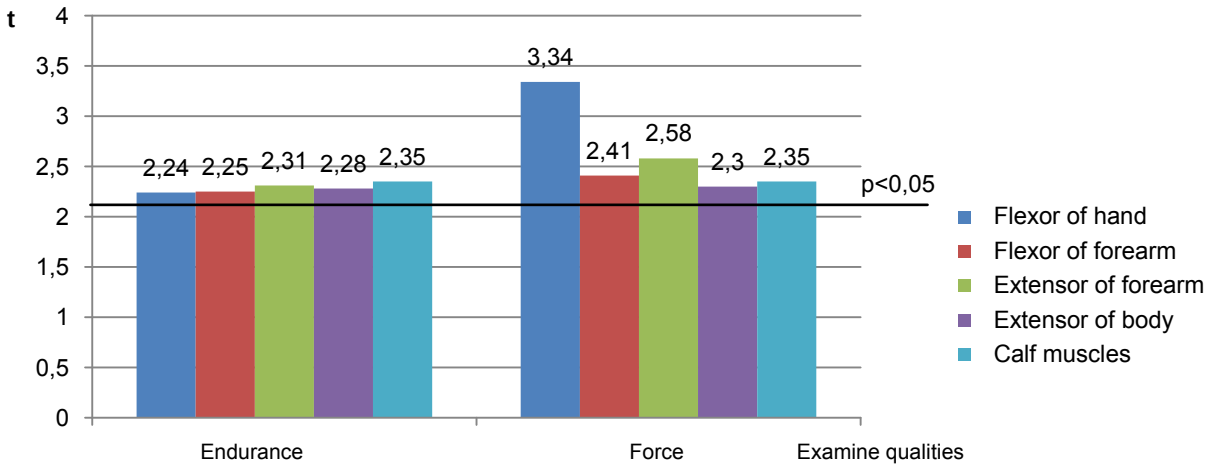

Fig. 1. The reliability of the variation of the static endurance and muscle groups studied athletes of experimental group compared with the control (July 2010)

Investigated power abilities calf muscles in both the experimental and the control groups significantly increased. But it should be noted that the athletes experimental group the increase was from 200,7 ± 4,3 s to 213,3 ± 3,81 s and in control - of 201,5 ± 5,26 s only 206,9 ± 4,05 sec, respectively intergroup difference was statistically significant ($p < 0,05$; $t = 2,35$) - table 1, Fig. 1.

On the basis of received data we can provide the following practical recommendations for coaches and experts of arm wrestling.

Stage of specialized basic training (16-17 years) provide for increasing time to improve combat vehicles at the table to 15%. Particular attention should be given to special physical training - 34%, for general physical training and differential physical training, accordingly, 14% and 18%.

Block of specialized training must focus on the development of explosive power, handling weak corners, the changing nature of work. Training with static loads are required for effective training arm wrestling and total load must contain at least 20%, that is part of static exercises - 40% ± 5% of the total special.

It is necessary to plan block of recovery training for physical and psychological recovery of athletes after a preparatory period and participate in sports, identifying and understanding mistakes and finding ways to address them. At this stage, there should not be a complete physical inactivity, it is necessary to exercise 2-3 training a day by means

of general physical training and supporting physical training: training should be conducted in recreational activities - cross training, sports, swimming in the pond, hemispecial exercises with rubber plaits and expanders.

Conclusion.

Based on a block system of training for 16-17-year arm wrestlers experimentally substantiated annual training program that includes 5 blocks: 1 - block of prior training (24 weeks); 2 - block of basic training (16 weeks) 3 - block of specialized training (8 weeks), 4 - competitive block (1 week), 5 - block of recovery training (3 weeks). Each stage of training has characteristic structure, time, destination and content characteristics. At stage of basic training correlation of static and dynamic loading is 31% and 69%, and at stage of specialized training - 38% and 62% of the total amount of specialized exercises.

Experimental program of training of 16-17-year arm wrestlers enabled significantly increase the performance of special strength training in all investigated muscle groups. Established that block system of workloads in annual macrocycle is quite effective. So, all the studied power indexes of athletes of experimental program significantly improved at the end of the experiment.

Further studies will be directed on individualization of sports training of arm wrestlers.

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THE USE OF OUTDOOR GAMES AND THEIR EFFECTS ON THE BODY OF SCHOOLCHILDREN

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Annotation. Research purpose - to ground and define the role of outdoor games in physical education of children of midchildhood. 20 children of midchildhood, which were up-diffused on two identical groups (control and basic) on age and to physical development for 10 schoolchildren are involved in research. It is set that for the children of basic group the reaction of the respiratory system became better on the physical loading (on results the leadthrough of test of Serkin), the considerable improvement of function of breathing organs took a place. Set necessity of perfection of process of physical education of children. The measures of strengthening of interest are recommended to the lessons of physical culture for children, distributing and selection of games on the years of teaching. It is recommended in the process of teaching expressly to adhere to the following method of education of physical capabilities: complexity, regularity and sequence; duration of implementation of games and volume of loading; intervals of rest and their character.
Keywords: outdoor games, physical development, schoolchildren, breathings.

Introduction.

Mobile game - is educational and health means of socialization that can intensify the educational process, provide a motivational basis for the formation of the dialectical relationship of physical and spiritual qualities and personal fulfillment. With outdoor games children develop not only physical qualities and abilities, but also master the first elements of literacy, learning by heart poems, patters, rhymes, develop mathematical skills and reveal for themselves live history of their people, learn to love folk heroes and hate offenders. Various mobile games are an effective means of recreation after mental work effectively affect the cardiovascular, respiratory, musculoskeletal systems, stimulate appetite and promote sound sleep. Meanwhile, outdoor games play an important role in education both as moral and volitional stability in actions and deeds, as education communication skills and conscious discipline: on the one hand - the ability to subordinate their behavior to the interests of the collective, and the other - to manage their comrades [2, 4, 7, 10, 11].

Analysis of scientific-methodical and professional literature on the issue of research has shown that educational effectiveness depends on playing techniques, organizational abilities leader, his ability to communicate clearly and explain interesting game skillfully manage its process, follow dosage exercise, be objective and careful in evaluating action game children improved tools (mobile and sports games, fun, relay races, the theoretical material sciences, moral dilemmas, moral and ethical situations), methods and forms (game and competitive, personal example of a teacher of physical culture, and self-control, rituals support and encourage of students, group discussions and individual interviews, penalties and incentives, stimulating interest and conscious participation of students in the learning process, the lessons of physical culture, race, hiking) physical education in the context of human qualities of students [5, 6]. First reviewed Ukrainian children's games in the context of ritual transition. Considered initiator role of game in the context of socialization and inculturation in traditional society. Proposed definition of child game as a kind of "daily ritual of transition" [1]. Physical activity levels of modern Ukrainian student according to the latest research, are not more than 5-10% of the number of performed minimum age of physical activity evolving nature, and physical activity of girls is 2-4 times lower than boys. An important reason for the deteriorating health of schoolchildren is also a significant decrease in physical activity with age [3, 8, 9]. To increase physical activity of schoolchildren and increasingly involve them in sports and physical education under the new standards from the first to the eleventh class it is increased the number of lessons of physical culture to three hours. As you know, the new state standards of basic secondary education were updated last year. There are not much researches of effectiveness of mobile games in physical education in primary school at children at today problem situation that take place in the modern school system of Ukraine according to deaths among schoolchildren and attempt to link them with excessive physical activity during physical education lessons. Our research is intended to promote physical education in secondary school.

The work is done according to the research theme “Effectiveness of physical rehabilitation of persons of all ages in violation of the functioning of body systems. Recovery of psychophysical properties of athletes by means of physical rehabilitation” International Economics and Humanities University named after Stephen Demianchuk, № state registration 0109U003032.

Aim, task, material and methods.

Aim of research – to substantiate and define the role of mobile games in physical education of children of primary school age.

Tasks of research:

1. Organize and summarize current scientific and methodological knowledge about the impact and possibilities of mobile games.
2. Determine the impact of mobile games on the body of children of elementary school.

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3. Justify the features of usage of mobile games during physical education children of school age, analyze and summarize the experimental data on the most rational methods and techniques of interest in the education of students in physical education at classroom and beyond it.

4. Determine the effectiveness of these methods and techniques, and how they are presumably and synergistically interact.

The study was conducted at the school. To organize our research we picked 20 children of primary school age and divided them into two identical groups according to age and physical development. Primary and control groups included 10 students.

Methods of research: analysis of the literature, pedagogical experiment, parameters of respiratory function, observation.

Results.

In the early school age there is the largest rate of growth of parameters that characterize speed-strength abilities. For three years in boys they grow by 44%, in girls - 34%. If these indexes can be seen in the age aspect, we can see that at boys aged 8 to 9 years old growth rate of physical ability is 22%, from 9 to 10 years - 4% and from 10 to 11 years - 18%. At girls, respectively - 11.5% and 18%.

Comparing the data on the growth of speed and power abilities, we concluded that in the early school years mobile games with exercises should take one of the main attractions. Their volume both boys and girls can be the same for all age groups.

On the basis of the results of the rate of development of physical abilities of students found out that the greatest increase of development of speed and agility accounted for primary school age, so at this age should be planed the most effective means of developing of these qualities - mobile games of speed and speed-strength character.

Experimental verification prove that the distribution and selection of games for years of study and their systematic conduction significantly improves the efficiency and quality of impact of mobilee games to develop speed, agility, flexibility, increases interest in physical education lessons in primary school children.

To prove the effectiveness of mobile games on the physical development of children of primary school age, we tested them at the beginning and end of the study. With the children of main group during the school year we conducted a variety of mobile games that meet the age physiological characteristics of these children.

Analysis of investigation of primary and control groups who were children of primary school age shown that at the beginning of the study children have a bad reaction to the respiratory system on physical loading according to the results of Serkin's tests. The reaction of respiratory system on physical activity in children of control group at the beginning of investigation was bad, the average score was equal to $1,3 \pm 0,3$; it indicates on insufficient development of respiratory system of children of primary school age. The reaction of respiratory system on physical activity in children the main group before the study was also bad, the average score was equal to $1,2 \pm 04$. That means that children of main and control group have insufficient development of the respiratory system. This points that shortcomings of the physical education classes with children of primary school age.

The reaction of respiratory system on physical activity according to the results of Serkin's tests at children of the control group at the end of the study remained unchanged, the average score at the beginning of research was $1,3 \pm 0,3$, and at the end - $1,2 \pm 0,4$.

The reaction of respiratory system on physical activity according to the results of Serkin's tests at children of basic group improved significantly at the end of the study, the average score at the beginning of research was $1,2 \pm 0,4$, and at the end of the study - $2,3 \pm 0,2$, it means that from the poor become average, that indicates the effectiveness of mobile games for children of primary school age. All the kids really like to play, so they do not refuse to play, and mobile games, in turn, promote physical development.

We have identified indicators of respiratory function and compared them with the average healthy children 6-7 and 8-9 years at children of control and basic groups at the beginning and at the end of the study (fig. 1, 2, 3).

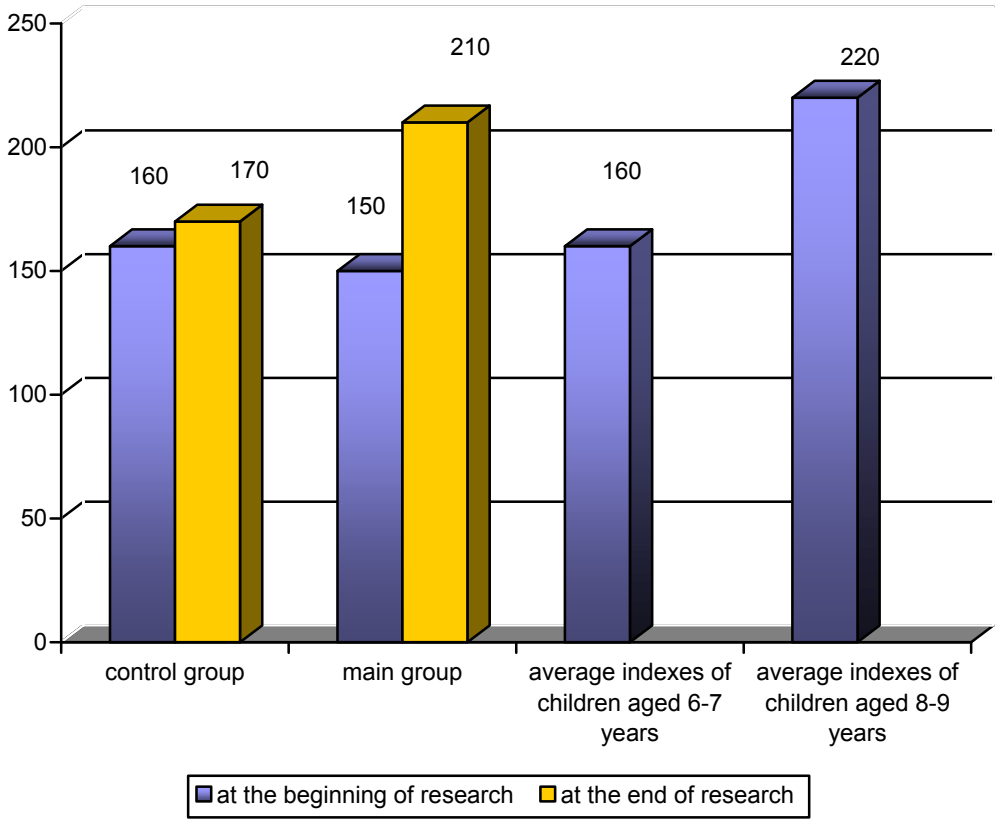

Fig. 1. Indexes of children respiratory volume of control and basic groups at the beginning and at the end of the study and average indexes of 6-7 and 8-9 years old children

Determination of respiratory volume of control and basic groups at the beginning of study showed that in both groups index is lower that the average index of healthy children. This demonstrates the need to improve physical education of children of primary school age. At the end of study indexes of children of control group do not changed, indexes of respiratory volume of schoolchildren of basic group significantly improved, approaching to the average indexes of healthy children. So, it proves the need of usage mobile games during physical education of children of primary school age.

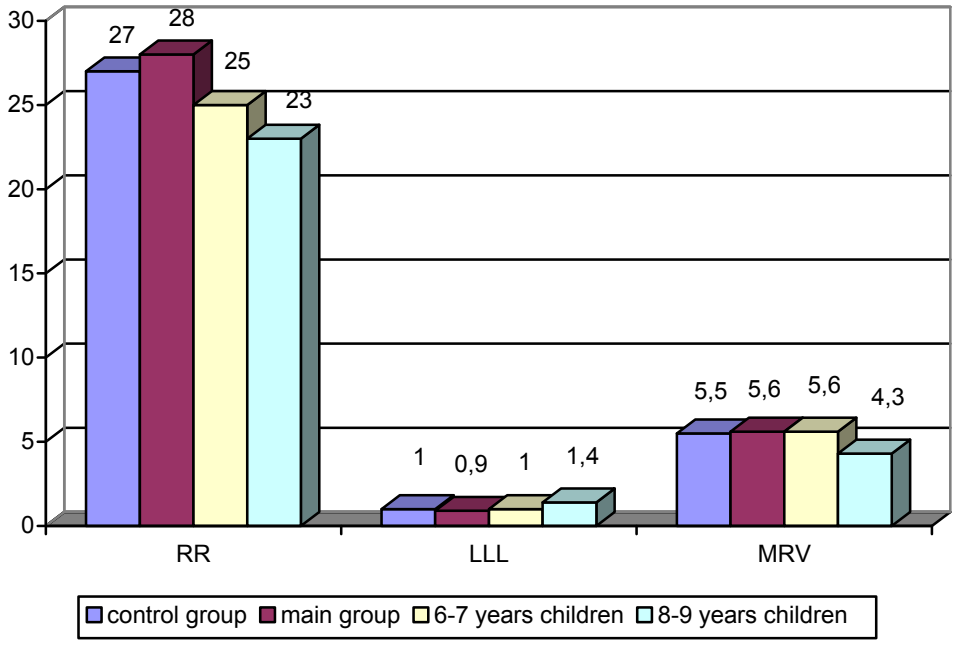

Fig. 2. Results of investigational indexes of respiratory function at the beginning of study
Notes: RR - respiratory rate per minute; LLL - lung vital capacity; MRV - minute respiratory volume

Investigation of respiratory function of children of control and main group at the beginning of study revealed that they did not significantly differ from the average data, but there is a slight deviation to decrease. Thus, LLL and minute respiration volume correspond to the average indexes for 6-7 years old children. Respiratory rate per minute in children of control and main group was lower the average of healthy children.

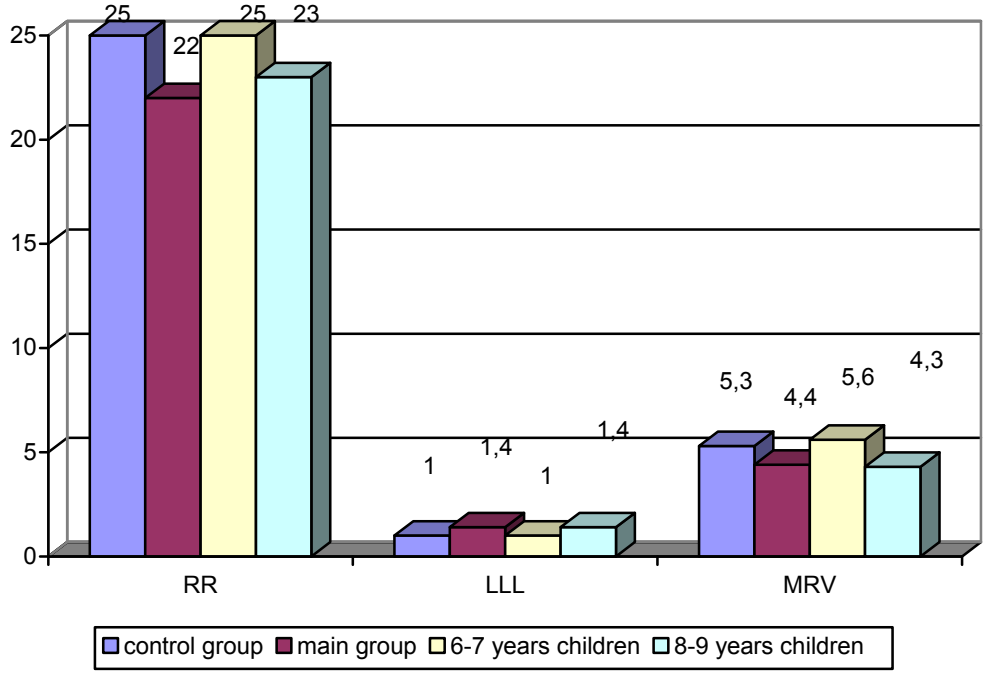

Fig. 3. Results of investigational index of respiratory function at the end of the study
Notes: RR - respiratory rate per minute; LLL - lung vital capacity; MRV - minute respiratory volume

The results of indexes changes respiratory function at the end of the study indicate that through the use of mobile games for children of basic group, there was significant improvement in respiratory function, while the performance of children of the control group remained unchanged.

These findings indicate a need to improve the physical education of children of primary school age and demonstrate the effectiveness of mobile games to improve physical fitness and respiratory function in children of this age.

Conclusion.

Effect of mobile games on the development of physical skills and abilities of younger schoolchildren considerably enhanced if the learning process is clearly adhere to the following methods of physical abilities education: complexity, regularity and consistency, duration of games and the amount of load; rest intervals and its character. Through the use of mobile games, children of basic group were significant improvement in respiratory function.

Prospects for further research. Our studies are aimed at determining the effectiveness of the impact of application mobile games on other body systems of students.

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PROBLEMS AND WAYS OF PERFECTION OF PHYSICAL TRAINING OF JUNIOR OFFICERS

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Annotation. Research of level and dynamics of physical preparedness of cadets of military institute during all period of education and young officers during the first three years of service in officer positions was conducted. The cadets of 1-5 courses (n=158) and officers of 1 age group (n=42) took part in researches. The level of physical preparedness was determined as a result of running on 100 m, pulling up on a cross-beam, running on 3000 m. It is set, that the results of cadets grow to the 4 course and stabilize and even gone down on 5 course. The level of physical preparedness of young officers, who had a desire to systematic employments by physical exercises during period of education in the institute, remains high during 3 years after the finishing. At young officers who are not independently engaged in physical preparation, the level of development of physical qualities gets worse in the process of service.
Key words: cadets, officers, physical, preparedness.

Introduction.

Analysis of the literature [2, 5, 10-13] showed that the requirements for training military specialists are constantly growing. Especially the preparation of young officers [4, 8].

The practice of modern warfare suggests that a high level of physical fitness and readiness of graduates of higher military educational institutions - young officers will significantly improve the combat readiness of armed forces. With the accelerating pace of technological upgrading, the armed forces require professionals who can obtain sophisticated military equipment in a short time and effectively use it in combat. The role of physical training, which aims to provide physical readiness of future officers to professional activities is increased.

Physical readiness – is a level of physical fitness of servicemen allowing them to perform tasks according to their positions. Physical readiness is one of the main conditions for the successful performance of their duties under combat conditions and effective performance of their tasks [1, 9].

However, the Minister of Defence orders stated that the level of physical preparedness of officers of the Armed Forces of Ukraine every year is getting worse. Yu. Borodin, Yu. Finogenov and others [1, 8, 10] argues that most officers do not come to class in physical training, and the number of officers involved themselves does not exceed 20%.

Researchers [1, 4, 5 and others] identify a number of reasons for the low level of physical fitness of young officers: the lack of necessary control by commanders to issues of physical training of young officers; reducing regulations to young officers compared with the requirements for the level of physical preparedness of graduates of higher military educational establishment; absence of stimulating factors and motivation to self-employment while studying in higher military educational establishment.

Work is done according to the plan of SRW of Management of physical training of the Armed Forces of Ukraine for years 2011-2015 on the theme “Organizational aspects of functioning of the system of physical training of the Armed Forces of Ukraine in modern conditions”.

Aim, tasks, material and methods.

Aim of work - determine the causes of low levels of physical fitness of officers of younger age groups.

Tasks:

1) examine the level and dynamics of physical fitness of students for the period of study in high school;

2) examine the level and dynamics of physical fitness of officers of younger age groups.

Methods of research. Theoretical analysis and synthesis of the literature, pedagogical observation, questioning, pedagogical testing.

Organization of research. The study involved students of 1-5 courses (n = 158) and officers of the first age group (30 years, n = 42) of Zhytomyr Military Institute named after S.P. Koroliov of National Aviation University.

Results.

We conducted analysis of the basic physical properties, based on the results of these exercises: running for 100 m, pulling on, running for 3000 m in 2007-2011, with the aim of investigation a level and dynamics of physical fitness of students.

Analysis of the results showed that in the period of study from 1st to 4th course is observed a tendency of indexes growing of physical training of cadets. At the 5th course development of all investigated physical properties stops and even has a regressive (Table 1, Fig. 1-3).

Research results shown by cadets running for 100 m during the whole period of study in higher military educational establishment indicates that the results on the 5th course was significantly higher only in comparison with the results that were shown on examinations of the 1st and 2nd year students ($P < 0,05$) (Fig. 1). Since the 4th year, the results have slight dynamics and reliably level ($P > 0.05$).

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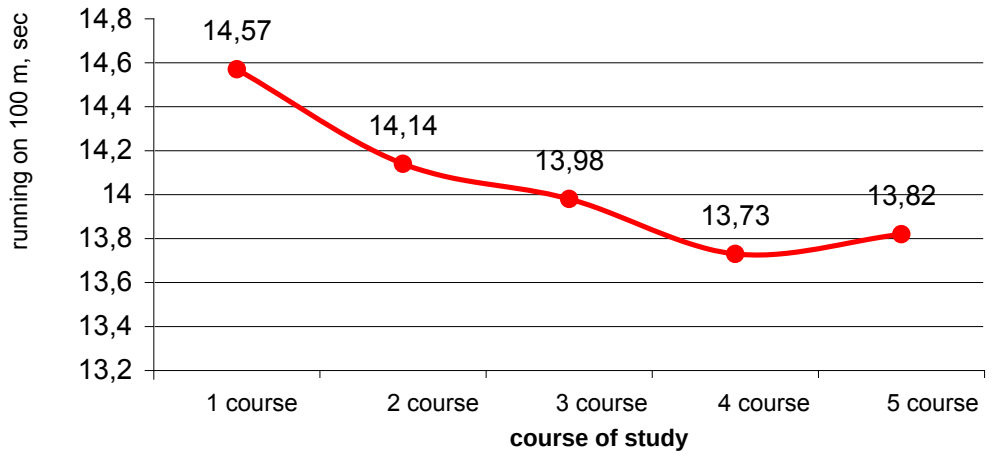

Fig. 1. Dynamics of results on 100 m running at students during the study period in higher military educational establishment (n = 158, c)

Table 1

Level and dynamics of indexes of physical quality development at students of higher military educational establishment during the period of education (n=158)

Course of study	1 course	2 course	3 course	4 course	5 course
n	*24*	*26*	*28*	*31*	*37*
100 m, c running					
X	14,57	14,14	13,98	13,73	13,82
m	0,12	0,10	0,08	0,08	0,09
Pull-up, times					
X	13,94	15,53	17,08	18,45	17,12
m	0,86	0,72	0,65	0,53	0,61
3000 m, c running					
X	771,5	744,9	716,7	703,1	718,6
m	8,13	6,26	5,03	2,97	3,25

It is important to note that the best indicator of the level of speed qualities was shown by cadets at the 4th year of study - 13,73 c, and only on 5th year of study average result is reduced by 0.09 c (P> 0.05) (Table 1).

Analysis of results from pulling-up at the 1-5-year students allowed to conclude that power qualities of students are developed enough - for all courses rated as "excellent", but on the 5-th year average results lower compared with the 4th course (Fig. 2). The results shown by cadets during exams in physical training at the 5th year are not significantly different from the results shown on the 3rd and 4th courses (P> 0.05). The best result of the tightening observed on the 4th year of study - 18.45 times. Significant difference was only between the results of students of senior and junior courses (P <0,05).

It should be noted that the increase in the average result of pulling-up of students in the 5th year compared with results that are shown in the 3rd course, is only 0.04 times (P> 0.05) (Table 1).

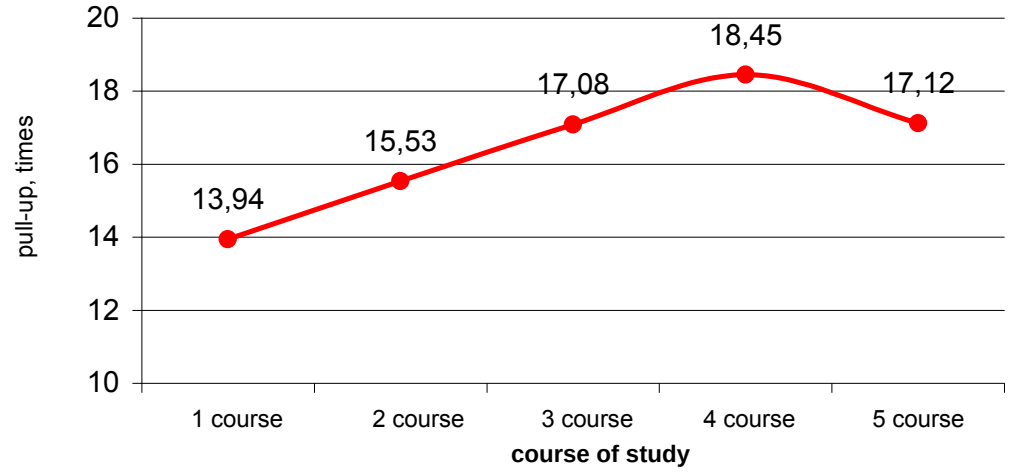

Fig. 2. Dynamics of pulling-up results of students during the period of study in higher military educational establishment (n = 158, at times)

Research of results in 3000 m running of students during the whole period of training in higher military educational establishment has the following dynamics: improved performance at the 1-4th courses and a decrease in the 5-th year of study relatively 4th (Fig. 3). The average result of students of the 5th year study were not significantly different from the results shown during examinations at 3-4 course (P> 0.05).

It should be noted that the best indicator of the level of endurance was shown by cadets during the examination of physical training on the 4 year of study - 11 min 43 c (Table 1).

Thus, the study of the dynamics of the level of physical properties showed that the existing system of physical training is not enough effectively creates physical fitness of cadets - future officers. Indicators of development of students' main physical qualities in the learning process change with the same trend - a progressive increase of indices in 1-4th course (P <0.05) and a certain decrease in the 5th year of study (P> 0,05). One of the reason for this problem is the lack of motivation in students of the 5th year of study since evaluation system under the same standards for students of 4th and 5th year students. On the 5th course students will not continue to improve their physical qualities, but keep up them that leads to lower levels of physical fitness.

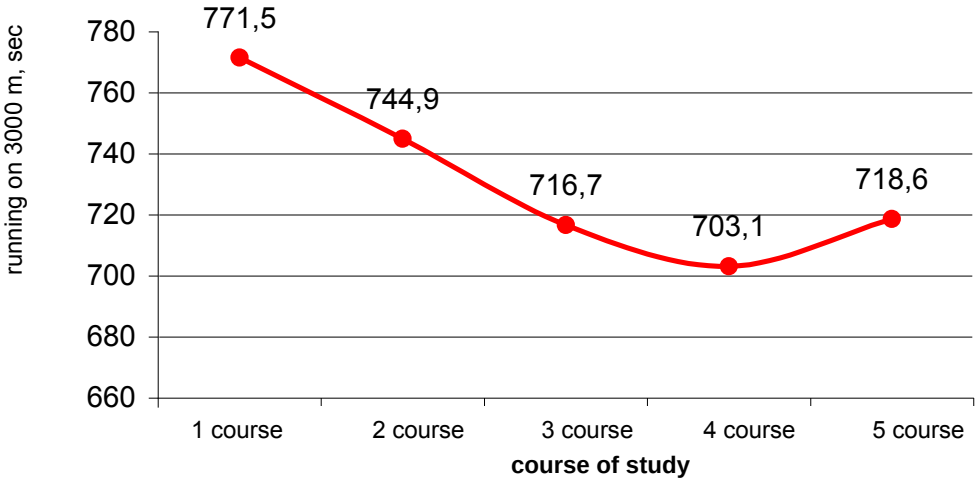

Fig. 3. Dynamics of results of cadets 3000m running during the period of study in higher military educational establishment (n = 158, c)

It was tested indicators of basic physical qualities of officers of first age group during the first 3 years of service for officer positions on the same exercises with the aim of investigation the level and the physical fitness of young officers, in which we analyzed the results of students.

Comparative analysis of the standards for determining the level of physical fitness of students of the 5th year

of study and officers of 1st age group showed that the current regulatory system is not enough stimulate young officers to systematic studies of physical training. So, graduating student received the highest mark in the exam for the execution of each exercise, and coming to troops in a month after the graduation already pass norms for other requirements (Table 2). Accordingly this young officer may without additional training for a long time to pass norms on positive mark. And if he will not go in for sport, the level of preparedness and training will decline significantly.

Table 2

Regulations for determining the level of physical training of students of the 5th year of study and officers of the 1st age group (management of physical training-2009)

Mark	Running 100 m, c		Pulling-up, times		Running 3000 m, min., c	
	Cadets of 5th year of study	Officers of 1st age group	Cadets of 5th year of study	Officers of 1st age group	Cadets of 5th year of study	Officers of 1st age group
5	13,8	14,6	15	13	12,00	12,50
4	14,2	15,0	13	11	12,20	13,10
3	15,0	15,8	10	9	13,10	14,00

To investigate the level of physical properties of young officers, we analyzed the results of physical training of officers of the 1st age group, which additionally engaged in physical exercise (group A) and officers who worked under the current system of physical training (group B). Distribution by groups of officers took place at the survey results. Group A included 13 persons (30.9%), group B - 29 persons (69.1%).

Analysis of the results of running at 3000 m showed that the rate of physical training of group A remain fairly stable for 3 years of service (P> 0,05), while in group B are reduced (Fig. 4). The difference between the results of group B officers on the 1st and 3rd years of service is 1 min 22 c (P <0.001).

The results of the study suggest:

- To raise standards for students of the 5th year;
- Enter classes in physical training in the 10th semester of study;
- To raise standards for officers of the 1st age group;
- The assessment of physical training of cadets senior courses and young officers enter the requirements for the implementation of the relevant sports category;
- To introduce requirements for officers, which provide assessment in physical training not less than "good", if appointed to a higher position and assigning the next rank.

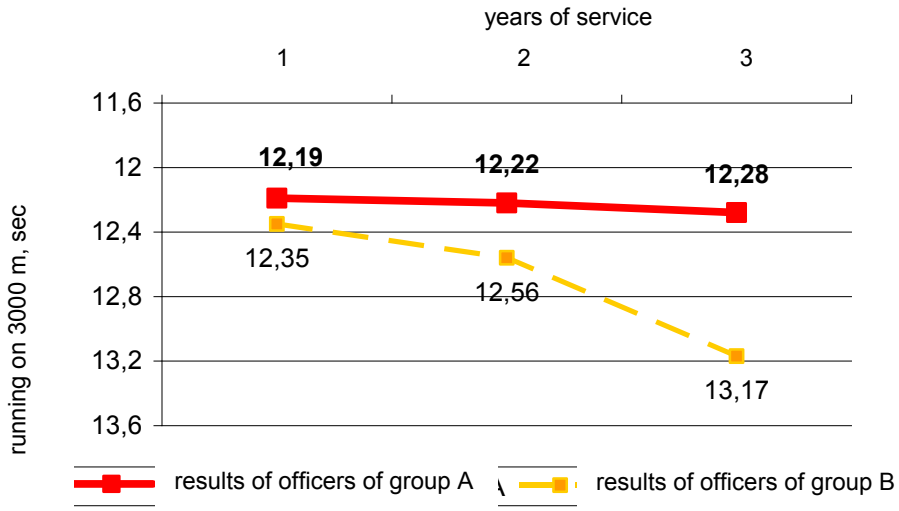

Fig. 4. Dynamics of results of 3000 m running of officers of the 1st age group for 3 years of service (n = 42, in minutes, c)

Conclusion.

The decrease of the level of physical preparedness of the students of the 5th year is established. Officers, who additionally do not engaged in physical training, have reducing of results of physical qualities during service in officer positions. Officers, who formed the desire and interest to systematic exercise while studying in higher educational establishment and continue to go in for sport after graduation, have consistently high results.

Prospects for future research is to analyze the performance of functional status and level of officers' physical

health in the younger age groups in the service activity.

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INTERCOMMUNICATIONS OF INDEXES OF SPEED AND POWER QUALITIES OF SPORTSMEN SINGLE COMBAT ON THE STAGE OF THE SPECIALIZED BASE PREPARATION

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Annotation. The purpose of work is a study of interdependence between indexes specially-preparatory and general preparatory exercises of sportsmen (boxing, sporting hand-to-hand fight hopak, fencing). 42 sportsmen took part in researches. Statistical reliable intercommunications are set: a) indexes of force of shots by hands with the indexes of rate of single movement; b) indexes of force of shots by feet with indexes from maximal force of muscles (tractive forces); c) indexes of speed of shots by hands (pricking) with the indexes of distance of shove of balls by mass 300 gramme; d) indexes of speed of movement a step in a battle bar with indexes: speeds of shots by hands (pricking); e) indexes of frequency of shots of boxers and sportsmen hand-to-hand fight hopak with the indexes of frequency of movement (manoeuvring) on feet. Facilities which it is expedient to apply in the training process of single combats on this stage of long-term preparation are certain.
Keywords: boxing, force, speed, fencings, single combats, hand-to-hand hopak.

Introduction.

Power-speed qualities are the base that determines the level of special physical preparation of athletes. Lack of development increases the duration of the formation of special skills during mastering the technique of the sport, reduces the effectiveness of competitive athletes [3, 6, 10, 14, 18, 19].

Sports fights inherent high intensity, significant mental, physical activity and emotional stress. In this regard, the role of physical training of single combat sportsmen [1, 9, 12, 15]. The results of studies of various aspects of preparation of single combat sportsmen confirmed high level of their competitive activity results dependence from the level of special physical training, in which the main aspect is to increase the effectiveness of actions [1, 2, 5, 11, 15, 19]. Methods of improving the power-speed qualities directed to improve the effectiveness of usage of specific actions covered in the scientific and technical literature in boxing [5, 9, 11, 13, 15], hand-to-hand hopak [2, 12], fencing [7, 18].

The development of power-speed qualities of single combat sportsmen due to selection effective tools and methods at each stage of long-term training remains relevant [4, 9, 14, 18, 19, 20]. Important role in this can play means of general physical training that will create a positive transfer of special physical qualities on special actions of athletes [4, 14, 17]. Analysis of scientific and methodist literature indicates that at the stage of basic specialized training of athletes topical definition of general prepared exercises and methods for their use, which positively affect the increase of special physical training athletes and mastery of technique specific actions [3, 8, 14, 18, 20-22].

Question of rationalizing of general prepared exercises use with the aim of effectively influence on the development of physical qualities of athletes is still topical, as well as the optimum correlation of general and special physical training at the stage of basic training of specialized athletes [2, 20]. Improving of single combats athletes should build on the use of a wide range of different general prepared exercises to prevent the formation of stable motor skills. This approach - the basis for improving the athletes on the stages of long-term training [14]. Experts recommend to use in training of single combats sportsmen various general developmental exercises, exercises with light and heavy athletics, the sports games. But these recommendations are based on practical experience and have no special scientific study [19]. Thus, the problem of rationalizing of physical training organization and its correction in the system of long-term training of athletes occupies an important place.

Studies were conducted according to the theme 2.9. "Personalization of training process of qualified single combat sportsmen" Consolidated Plan of scientific and research work in the field of physical culture and sports on year 2011-2015.

Aim, task, material and methods.

Aim of research – to explore the relationship between performance of specially prepared and general prepared exercises of single combat athletes (boxing, sports hand-to-hand hopak, fencing) at the stage of specialized basic training.

Tasks of research: to determine the correlation of relationships between indicators of specially prepared and general prepared exercises of single combat athletes.

Methods of research: theoretical analysis and synthesis; chronodynamometry; teacher testing; methods of mathematical statistics

Organization of research. In research participated 42 single combat male athletes of first sport category and candidates for master of sports that train at the stage of specialized base preparation. There are 17 boxers, 12 athletes of hand-to-hand hopak, 13 fencers. The study was conducted at the end of the preparatory period.

After a standard warm-up [11, 13] measured the indexes of specially prepared and general prepared exercises of single combat athletes. For this purpose applied chrono dynamometr [15] to determine the strength of single punches and kicks, blows frequency and five-channel electronic chronometer [16] to determine the speed of boxers and hand-to-

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hand hopak athletes bumps, velocity of armed hand of fencers (blow and injection distance 90 cm), speed of movement in combat stance step forward for a distance of 50 cm, the rate of movement of the shuttle in a combat stance step forward and a step back for a distance of 50 cm for 30 c, running speed at a distance of 6 meters.

Explosive force in general prepared exercises defined by distance parameters at which athletes can perform push balls weighing 300 g, 1 kg, 2 kg, 3 kg, 5 kg and long jump from their seats.

Maximal muscle strength (traction) is determined using torso dynamometer.

Strength endurance measured by quantitative indicators of pulling-up, bending and straightening the arms in emphasis lying, the number of sit-ups in thirty seconds time interval, the number of exercises at the push rod weighing 20 kg for 30 seconds.

On the correlation analysis is matched the general physical exercise, among which found statistically significant relationship with performance specially prepared exercises of single combat athletes, and under which the possible transfer of positive physical qualities of athletes on stage of specialized basic training.

Results.

On the research results of boxers (n = 17) it is established reliable statistic relationships between indexes of such specially prepared and general prepared exercises on the stage of specialized basic training (fig. 1):

- time of single blow with the time of moving in combat position step forward ($r = 0,533$; $P< 0,05$), with impact force by the hand ($r =- 0,601$; $P< 0,05$), with distance of pushing a ball weight 300 g ($r = 0,594$; $P< 0,05$);
- time of movement in a combat stance step forward with distance of ball pushing weighing 2 kg ($r = 0,603$; $P< 0,05$);
- frequency of attacks for 4 seconds with the frequency of movement (maneuver) on foot boat for 10 sec. ($r = 0,585$; $P <0,05$), with quantitative measure of rod pushing weighing 20 kg ($r = 0,622$; $P< 0,01$);
- frequency of movement on legs (maneuvering) with quantitative measure of rod pushing weighing 20 kg ($r = 0,675$; $P< 0,01$);
- punching power by hands with kicking power ($r = 0,689$; $P <0,01$), with distance of ball pushing weighing 300 grams ($r = 0,593$; $P <0,05$), with distance indicators of pushing balls weighing 2 kg ($r = 0,487$; $P< 0,05$) or 1 kg ($r = 0,554$; $P< 0,05$), with indexes of maximal muscle force ($r = 0,521$; $P< 0,05$), with quantity index of dropping a bar weighing 20 kg ($r = 0,495$; $P< 0,05$);
- distance of ball pushing weighing 2 kg with distance of ball pushing weighing 300 g ($r = 0,516$; $P< 0,05$);
- distance of ball pushing weighing 1 kg with distance of ball pushing weighing 300 g ($r = 0,578$; $P< 0,05$) and 2 kg ($r = 0,634$; $P< 0,01$);
- indicators of maximum muscle strength with distance of pushing balls weighing 300 g ($r = 0,611$; $P< 0,01$), 2 kg ($r = 0,542$; $P< 0,05$), 1 kg ($r = 0,499$; $P< 0,05$), and also quantity index of dropping a bar weighing 20 kg ($r = 0,630$; $P< 0,01$);
- quantity of index of dropping a bar weighing 20 kg with distance of pushing balls weighing 300 g ($r = 0,537$; $P< 0,05$), 2 kg ($r = 0,683$; $P< 0,01$), 1 kg ($r = 0,514$; $P< 0,05$), with amount of extension and bending of hands with support lying ($r = 0,583$; $P< 0,05$), pulling on horizontal bar up ($r = 0,522$; $P< 0,05$), squatting for 30 sec. ($r = 0,641$; $P< 0,01$);
- quantity index of extension and bending of hands with support lying with a number of pulling on horizontal bar up ($r = 0,519$; $P< 0,05$) and squatting for 30 sec. ($r = 0,486$; $P< 0,05$).

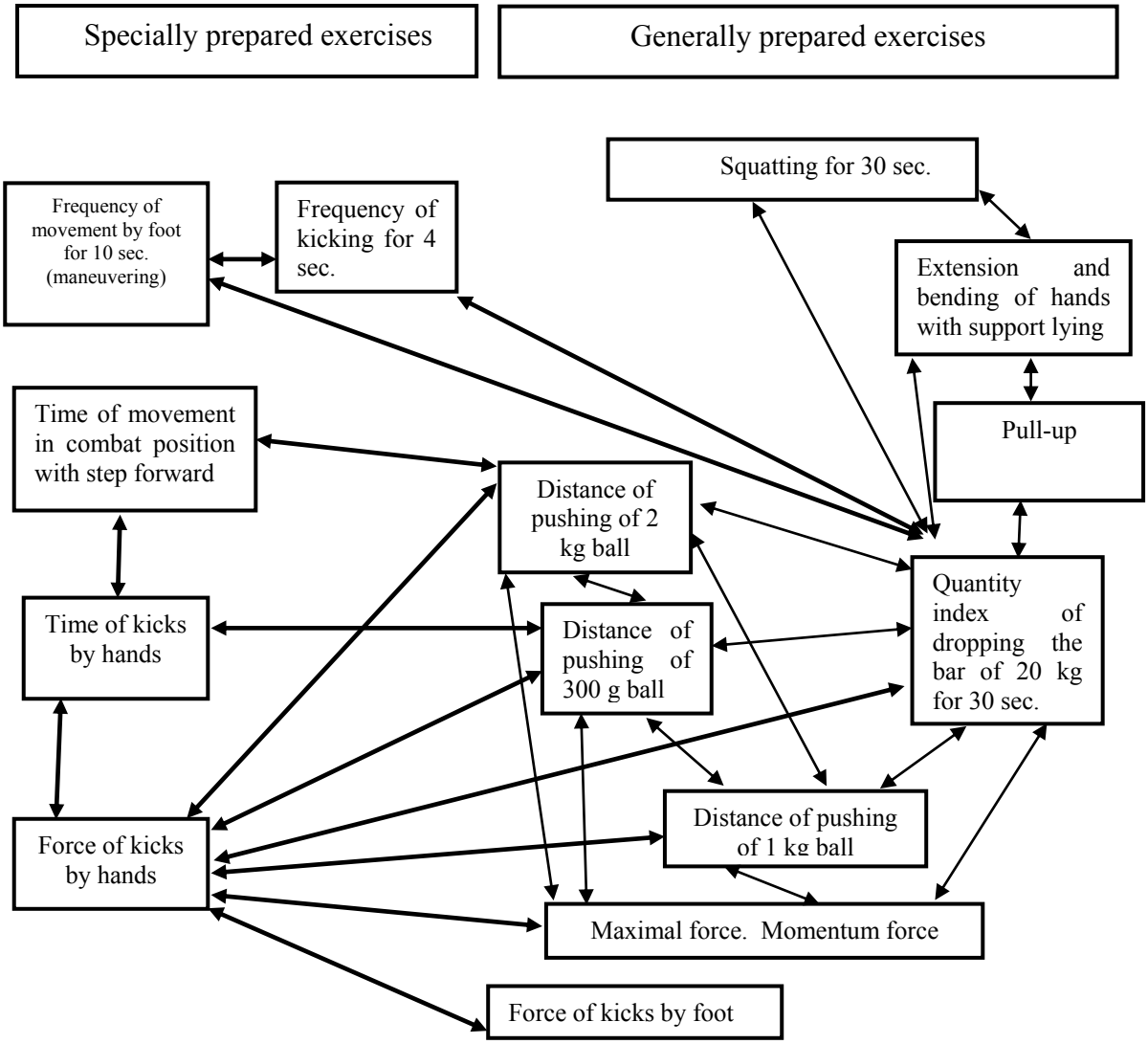

Fig. 1. Scheme correlation between indicators of specially prepared and generally prepared exercises of boxers on a stage of specialized basic training

At athletes of hand-to-hand hopak (n = 12) are found reliable statistical relationship between indicators of generally prepared and generally prepared exercises on stage of specialized basic training (Fig. 2):

- time of single kicks by hands with distance of pushing the ball mass 300 g (r = 0,672; P< 0,05);
- frequency of kicks by hands for 4 sec. with frequency of movement (maneuvering) on foot boat for 10 sec. (r = 0,631; P< 0,05), with quantity index of dropping the bar weigh 20 kg for 30 sec. (r = 0,588; P< 0,05);
- force of kicks by hands with force of kicks by foot (r = 0,699; P <0,05), with distance of pushing balls weighing 1 kg (r = 0,650; P <0,05) and 2 kg (r = 0,663; P <0, 05), with indicators of maximum muscle strength (r = 0,597; P <0,05), with quantitative measure of dropping the bar weighing 20 kg in 30 seconds (r = 0,588; P< 0,05);
- force of kicks by foot with distance of pushing balls weighing 2 kg (r = 0,578; P< 0,05), with indicators of maximum muscle strength (r = 0,602; P< 0,05);
- distance of pushing 1 kg ball with distance of pushing 300g ball (r = 0,579; P< 0,05) and 2 kg (r = 0,744; P< 0,01), with indexes of maximal muscle strength (r = 0,625; P< 0,05),), with quantitative measure of dropping the bar weighing 20 kg in 30 seconds (r = 0,593; P< 0,05);
- distance of pushing 2 kg ball with distance of pushing 300g ball (r = 0,584; P< 0,05), with indexes of maximal muscle strength (r = 0,590; P< 0,05), with quantitative measure of dropping the bar weighing 20 kg in 30 seconds (r = 0,661; P< 0,05);

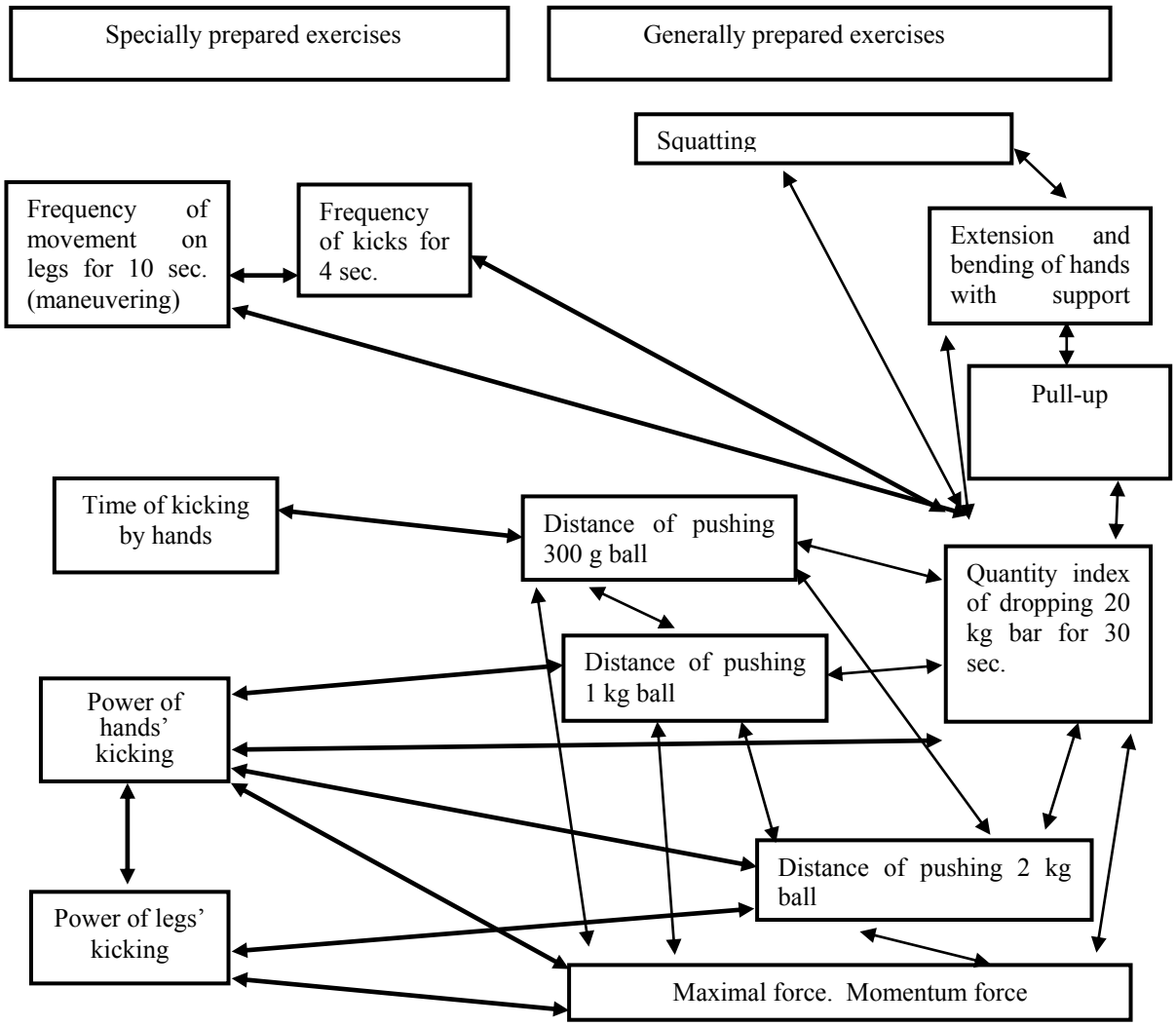

Fig. 2. Scheme of correlation between indicators of specially and generally prepared exercises of athletes of hand-to-hand hopak on stage of specialized basic training

- indexes of maximal muscles strength with distance of pushing 300 g ball ($r = 0,622$; $P< 0,05$);

- quantity index of dropping 20 kg bar for 30 sec. with frequency of movement on foot boat for 10 sec. ($r = 0,552$; $P< 0,05$), with distance of pushing 300 g ball ($r = 0,631$; $P< 0,05$), with maximal muscle strength ($r = 0,605$; $P< 0,05$), with quantity of extension and bending of hands with support lying ($r = 0,693$; $P< 0,05$), pulling-up ($r = 0,584$; $P< 0,05$), squatting for 30 sec. ($r = 0,640$; $P< 0,05$);

- quantity index of extension and bending of hands with support lying with number of pulling-up ($r = 0,609$; $P< 0,05$) squatting for 30 sec. ($r = 0,577$; $P< 0,05$).

As a result (n = 13) it is found out reliable statistical relationship between these indicators of *specially and generally prepared exercises* on stage of specialized basic training (fig. 3):

- time of movement of attack hand (attack action) with time of movement in combat bar with step forward ($r = 0,736$; $P< 0,01$), with distance of pushing 300 g ball ($r = 0,627$; $P< 0,05$);

- time of movement in combat bar with step forward with distance of pushing 2 kg ball ($r = 0,641$; $P< 0,05$), with quantity index of dropping 20 kg bar for 30 sec. ($r = 0,578$; $P< 0,05$);

- power of hands' kicking with indexes of maximal muscle strength ($r = 0,582$; $P< 0,05$), with distance of pushing 300 g ball ($r = 0,642$; $P< 0,05$), 1 kg ($r = 0,578$; $P< 0,05$), 2 kg ($r = 0,604$; $P< 0,05$), 3 kg ($r = 0,619$; $P< 0,05$), 5 kg ($r = 0,565$; $P< 0,05$);

- indexes of maximal muscle strength with distance of pushing 300 g ball ($r = 0,570$; $P< 0,05$), 1 kg ($r = 0,669$; $P< 0,05$), 2 kg ($r = 0,563$; $P< 0,05$), 3 kg ($r = 0,634$; $P< 0,05$), 5 kg ($r = 0,591$; $P< 0,05$), and also with quantity index of dropping 20 kg bar ($r = 0,690$; $P< 0,01$);

- distance of pushing 300 g ball with distance of pushing 1 kg ball (r = 0,771; P< 0,01), 2 kg (r = 0,623; P< 0,05), 3 kg (r = 0,679; P< 0,05), 5 kg (r = 0,617; P< 0,05), and also with quantity index of dropping 20 kg bar (r = 0,633; P< 0,05);

- distance of pushing 2 kg ball with distance of pushing 1 kg ball (r = 0,835; P< 0,001), 3 kg (r = 0,904; P< 0,001), 5 kg (r = 0,699; P< 0,01), and also with quantity index of dropping 20 kg bar (r = 0,682; P< 0,05);

- distance of pushing 1 kg ball with distance of pushing 3 kg ball (r = 0,772; P< 0,01);

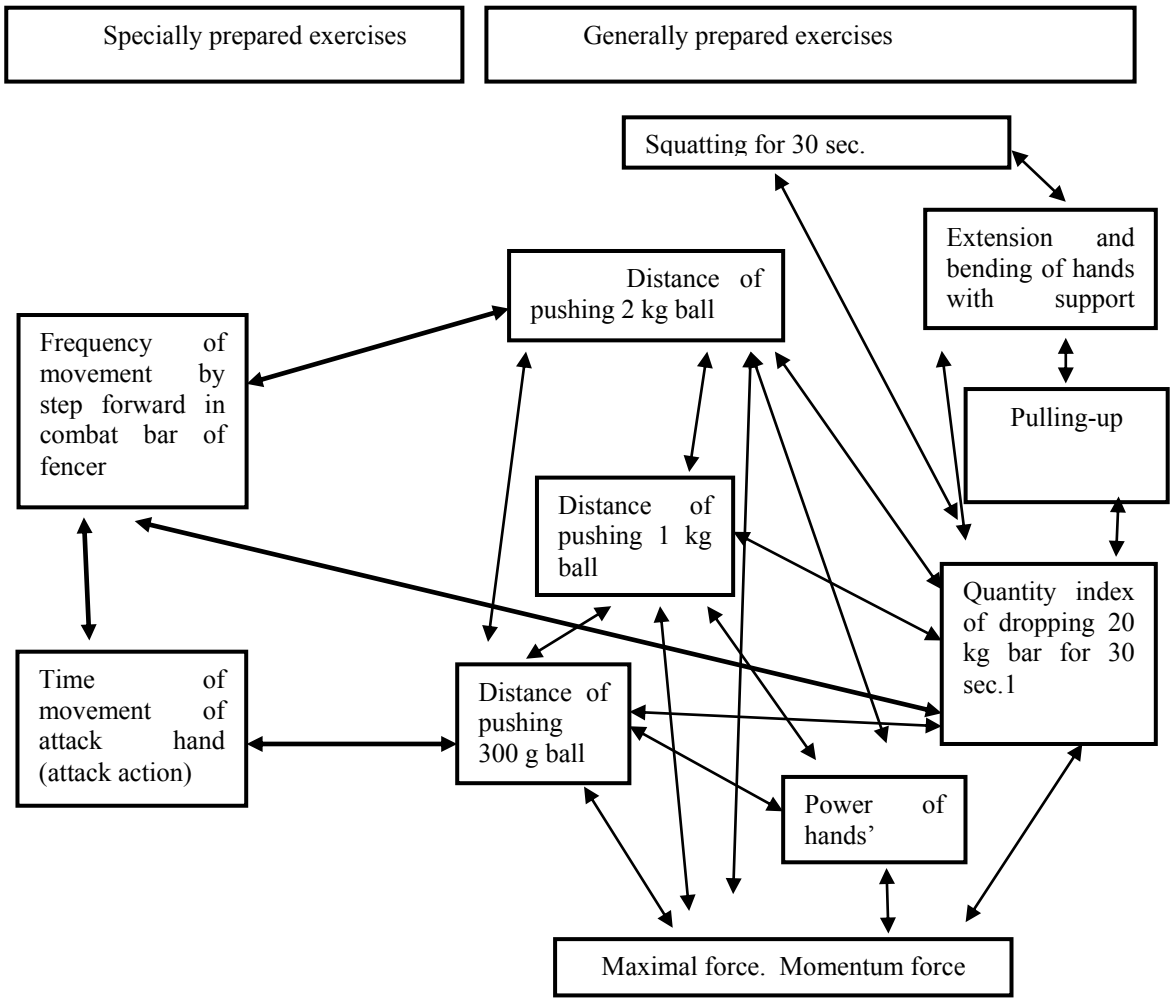

Fig. 3. Scheme of correlation between indicators of specially and generally prepared exercises of fencers on stage of specialized basic training

- distance of pushing 5 kg ball with distance of pushing 1 kg ball (r = 0,720; P< 0,01), 3 kg (r = 0,718; P< 0,01), and also with quantity index of dropping 20 kg bar (r = 0,617; P< 0,05);

- quantity index of dropping 20 kg bar for 30 sec. with distance of pushing 1 kg ball (r = 0,590; P< 0,05), 3 kg (r = 0,631; P< 0,05), with number of extension and bending of hands with support lying (r = 0,562; P< 0,05), pulling-up (r = 0,588; P< 0,05), squatting for 30 sec. (r = 0,610; P< 0,05);

- quantity index of extension and bending of hands with support lying with number of pulling-up (r = 0,611; P< 0,05) and squatting for 30 sec. (r = 0,556; P< 0,05).

Conclusion.

1. At the stage of specialized basic training of single combat athletes it is found out statistically significant relationship:

a). indexes of hands' kicking with indexes of: speed single motion, force kicks, distance of pushing balls of different mass, number of dropping 20 kg bar, value of maximum force (momentum force);

b). indexes of feet kicking with indexes of: power of hands' kicking, maximum muscle strength (momentum force), distance of pushing 2 kg balls;

c). indexes of speed of hands' kicking with indexes of: distance of pushing 300 g balls, the speed of movement in single combat stance step forward, compensatory fluctuations between speed and power characteristics of technology of kick (the less power has kick, the higher will be speed);

d). indexes of speed of movement by step in a combat bar with indexes of: speed of hands' kicking, distance of pushing 2 kg balls;

e). indexes of frequency of boxers' kicks and athletes of hand-to-hand hopak with indexes: frequency of movement (maneuver) by the legs, the number of pushing rod weighing 20 kg.

2. On a stage of basic training of single combat athletes (box, sports hand-to-hand hopak, fencing) in training process it is used specially and generally prepared exercises between which are statistic correlation relationships.

Specially prepared exercises:

- attack actions with installation of speed enforcement (box, hand-to-hand hopak, fencing);
- movement in a combat stance step forward with the installation of speed enforcement (boxing, hand-to-hand hopak, fencing);
- series of punches with a maximum frequency in the interval 4 sec. (boxing, hand-to-hand hopak);
- movement on foot boat in combat stance in the time interval 10 sec. (boxing, hand-to-hand hopak, fencing);
- punches with the installation of "fast-strong" (specially prepared exercise for boxers and athletes of hand-to-hand hopak, generally prepared exercise for fencers);
- kicks by feet with installing "fast-strong" (specially prepared exercise for athletes of hand-to-hand hopak, generally prepared exercise for boxers and fencers).

Generally prepared exercises for boxers, sportsmen of hand-to-hand hopak, fencing;

- pushing balls weighing from 300 g to 5 kg with the installation of the most greater distance;
- traction of bar with maximum force;
- dropping a bar weighing 20 kg for 30 sec. (quantitative index);
- pulling-up (quantitative index);
- extension and bending of hands with support lying (quantitative index);
- squatting for 30 sec. (quantitative index).

In further studies it is assumed to determine the appropriateness of applying certain specially and generally prepared exercises of single combat athlete with the aim to develop their physical qualities at different stages of long-term preparation, depending on the type of sport fight.

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COMPUTER ONTOLOGY AS AN INSTUMENTAL PLATFORM TO ENSURE TRANSPARENCY OF THE EUROPEAN AND NATIONAL QUALIFICATIONS FRAMEWORKS

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Annotation. The article analyzed the instrumental platforms of European and national qualifications frameworks. It was found that the European Qualifications Framework contains eight interrelated levels where qualifications determined by training results - triad professional qualities: knowledge, skills and competencies. This approach helps to compare qualifications and simplifies their recognition. The study gives examples of modern instrumentation platforms of the European and national qualifications frameworks to facilitate the establishment of the balance of the qualifications mentioned advantages and disadvantages of each approach. Proved that the qualifications frameworks can successfully functioning based on the ontological approach, the content of which is to present the subject area of knowledge with a help of computer ontologies. Ontology is a description of declarative knowledge in the form of classes with the relation between them. The article highlighted the features editor Protege-OWL for building subject-oriented ontology.
Keywords: knowledge, skills, competencies, qualifications, ontology, OWL.

Introduction.

Ukraine's desire to join the European educational space, balancing of national interests and educational and labor market, improving the quality and effectiveness of training, on the one hand, and globalization, technological, economic and demographic changes, labor mobility – on the other hand, require the development and implementation of national qualifications. Based on the results of the study, the national qualifications will not only transparency in establishing value of diplomas, certificates or certificates of education, but will be a catalyst for the modernization of the education system, expand access to entry qualifications. National Qualifications Framework provides National Qualifications Framework (NQF), which coordinates with the European Qualifications Framework (EQF) and promote greater understanding of the national qualifications framework and implementing the concept of lifelong education.

Year ago, Ukraine adopted the National Qualifications Framework (Cabinet of Ministers of Ukraine Order "On Approval of the National Qualifications Framework", № 1341 from 23.11.2011). However, the Order only talking about the determination of levels of qualifications, and their content, the ratio of European Qualifications Framework, strategy of national qualifications require further elaboration. For today there is no understanding of common vision of instrumental platforms of national qualifications framework that would allow to set the balance of the qualifications framework, providing for international comparison and recognition.

Thus, the rationale instrumental platform to ensure transparency of the European and National Qualifications Frameworks is, in our opinion, relevant and timely scientific challenge.

Conceptual framework and methodological aspects of the implementation of the National Qualifications Framework is being actively discussed by academic community of Ukraine, in particular V. Lugovoi [5], [6] H. Podkovka, [9] Y. Suharnikovym, [10] V. Khomich [Khomich V.F. Forming of key competence of specialists in a structure of National Qualifications Framework. http://zavantag.com/docs/1861/index-15321.html] and others. Domestic scholars analyze the use of experience in creating the European and National Frameworks of qualifications, a description of which contain works of foreign researchers - V. Baydenko [3], A. Muravyova, O.Oleynykova, M.Koulz [7], [Oleynykova O.N., Muravyova A.A. Institutional mechanisms of NQF. - http://www.cvets.ru/NQF/NQF-InstMec.pdf], [8], D. Raff, M. Yang. The purpose of this analysis is the development and implementation of new educational standards as the basis for transforming the curriculum and other components of the system of educational and methodological support of specialists' training, and fundamental renewal of methods and means of diagnosing learning outcomes [1]. However, the study of instrumental platforms of European and National Qualifications Frameworks that facilitate installation ratio of qualifications, ensuring their transparency and international recognition of the periphery of scientific research, and some works do not give a general understanding of the problem. For example, to set the balance of European and National Qualifications Framework helps special mechanism – interactive table posted on the portal Commission on the European Qualifications Frame [http://ec.europa.eu/eqf/compare_en.htm]. These interactive tables allow you to compare the national level with EQF. Significant is the fact that these interactive tables provide access to descriptors, whereby the description of levels of qualifications. It descriptors enable to consider learning outcomes through the prism of categories such as knowledge, skills and competence. However, given the mechanism precluded analyze the level of qualifications, establish the relationship between the educational and professional qualifications. Exactly descriptors enable to consider the results of education through the prism of such categories as knowledge, skills and competence. However, given mechanism precluded to analyze the level of qualifications, to establish the relationship between the educational and professional qualifications.

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Today in the European Union is realizes a project TRACE (TRAnsporentCompetenceinEurope), whose goal is also to ensure transparency between the European Qualifications Framework and the national scope of countries that are in the EU [Lundqvist, K. O., Baker K. D., Williams, S. A. An ontological approach to competency management:. http://www.eife-l.org/publications/proceedings/ilf07/Contribution110.doc.pdf]. Unlike interactive tables of European Commission Portal developed within the project TRACE computer ontologies allow to link educational and professional qualifications, which greatly simplifies the process of establishing the balance of qualifications. However, educational qualifications, which are used in the project TRACE, are based on the curriculum. This approach complicates the process of determining the appropriate qualifications as national educational qualifications based on industry educational standards that must also be submitted in the form of semantic value domain. Computer ontology can become such proposal.

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Aims, tasks, material and methods.

Aim of the paper is to analyse and argue a selection of computer ontologies as instrumental platform of European and National Qualifications Frameworks.

Results.

The European Qualifications Framework is essentially a meta-frame that provides comparison of different national qualifications framework qualifications. It is particularly important in terms of increasing globalization of the labor market and labor mobility, and academic mobility in the integration processes of education, especially in Europe (Bologna and Copenhagen processes).

European qualifications framework contains eight interrelated levels at which qualifications shall be determined by training – triad of professional qualities: knowledge, skills and competencies. This approach helps to compare qualifications and simplifies of their recognition. Imagine that an organization or company in one of the European Union countries, such as Sweden, hesitates in choosing candidate from another country, including France, to a certain position. This is due to the fact that employers do not understand French candidate qualifications. However, once matched with French qualifications framework EQF, the Swedish employers with similar comparisons get detailed information about the qualifications of the applicant.

As rightly noted by researchers Oleinikova O. and A. Muravyova, national qualifications are not designed only to describe the qualifications, but also for modernization of vocational education and training, increase public access to qualifications. The role of national qualifications frameworks in modernization is that professional education must move to educational results. It is necessary to develop cooperation in the workplace, develop professional standards, new technology assessment competencies that form the basis of qualifications and recognize educational results, regardless of whether they have been achieved in the field of formal or informal education. Role of NQF in expanding access to qualification is that due to the frame people can determine their own jurisdiction, without going for this training within compulsory education programs that, among other things, enables the optimization of resources for education and formation of flexible education pathways [Oleinikova O.N., Muravyova A.A. Institutional mechanisms of national qualifications frameworks - http://www.cvets.ru/NQF/NQF-InstMec.pdf].

In its report "Implementation of national qualifications framework. International Context" at the International scientific conference "European integration of higher education in Ukraine in the context of the Bologna Process", held October 25, 2012, Olav Antti said that the 14 EU Member States (AT, BE-vl, CZ, DK, EE, FR, IE, MT, LT, LU, LV, NL, PT, UK) and one candidate country for EU accession (HR) with existing national qualifications framework and June, 11-12, 2012 submitted its national reports of Consultative Group EQF. This 11 EU Member States (BG, DE, EL, ES, IT, KY, NO, PL, RO, SE, SI), one candidate country (IS) are preparing to submit their national reports Consultative Group EQF during 2012 year, 4 Member States (BE-f, FI, HU, SK) and one country candidate (TK) - in 2013 [Aarna O. Implementation of national qualifications framework. International Context. http://www.ihed.org.ua/images/pdf/6_oa_ukr.pdf].

Ukraine also joined the elaboration and implementation of the national qualifications system. As stated in the draft Concept of national qualifications (on 16.10.2012), the formation and development of national qualifications of Ukraine aims to implement policies for lifelong education and is based on common European principles and guidelines for quality assurance in education and vocational training [Project of Concept of national qualifications development (on 16.10.2012): http://www.ihed.org.ua/images/pdf/conseption.pdf].

National Qualifications Framework involves social partners in the processes related to recognition education, development and quality assurance and awarding qualifications. Recognition of educational results is independent of the method of acquisition – both by recognizing formal and informal and spontaneous education.

It should be noted that the priorities of the national qualifications are:

- ensuring of qualifications to labor market needs, development of the economy, society and citizens;

- increasing the participation of social partners in the processes related to the recognition of educational results, development and quality assurance and awarding qualifications;
- establishing of mechanisms for recognition of educational results regardless of their method of acquisition;
- ensuring of flexibility of qualifications including a variety of trajectories (paths) of acquisition and improvement;
- enhancing the competence of employees;
- recognition of the value of qualifications by social partners (social recognition of qualifications);
- ensuring of international comparability / transparency and recognition of qualifications acquired in Ukraine

[Project of Concept of national qualifications development (on 16.10.2012): http://www.ihed.org.ua/images/pdf/conseption.pdf].

- The main element of the national qualifications is the National Qualifications Framework (NQF), including all levels and subsystems of qualifications and relates to the European Qualifications Framework for lifelong education. National Qualifications Framework describes the levels for all subsystems qualifications - qualifications as formal education and professional qualifications. Comparison qualifications of skill levels NQF based on correlation of educational results for a particular type of qualifications describing a qualification NQF. Du as it shown in [Project of Concept of national qualifications development (on 16.10.2012): http://www.ihed.org.ua/images/pdf/conseption.pdf] there are a number of difficulties that prevents the introduction of the National Qualifications Framework in Ukraine:
- existing qualifying characteristics of professional areas and educational standards do not account system of NQF competencies and usually, they can not compare with the national and European qualifications frameworks;
- present structure of industry standards for higher education is overly complicated and regulated, limits the ability of educational institutions to modify training programs according to the needs of the labor market;
- higher education qualifications are not formally compared with the qualifications of the European Higher Education Space (EHES);
- competency standards for a large number of classes and subclasses of professions are not formed, so that there are difficulties with the assignment of professional qualifications;
- lists of areas and specialties of higher education too detailed and does not meet the needs of the labor market.

To solve these problems it is recommended to carry out the following steps:

- to develop specifications of domestic educational qualifications with regard descriptors of the National Qualifications Framework;
- to conduct a formal comparison of domestic educational qualifications from the National Qualifications Framework (by the levels);
- compare the national higher education qualifications framework with qualifications of the European Higher Education Space;
- take measures to implement complex competentive approach in educational standards and curricula, teaching practices and assessment;
- form professional standards taking into account descriptors of National Qualifications Framework and professional qualifications comparison of qualification levels NQF;
- introduce new approaches to develop industry standards for higher education, determining that:

a. industry standards developed by the higher education sectors of education, which list appropriate form in accordance with the International Standard Classification of Education (ISCED);
b. industry standard of higher education is a holistic document, which must include a description of socio-personal, general, and instrumental generally professional competencies and demonstrate methods and criteria for evaluation of educational results;

- recognize the inseparable academic rights and responsibilities of higher education institutions the ability to identify specifically and professional competence (educational results) graduates and create educational and vocational training program.

Solving of outlined above problems is subject to the use of instrumental platform for establishing the balance of qualifications to ensure transparency of European and national qualifications frameworks.

According to researchers [Lundqvist, K. O., Baker K. D., Williams, S. A. An ontological approach to competency management:. http://www.eife-l.org/publications/proceedings/ilf07/Contribution110.doc.pdf.], platform can provide such tools as RCD (Reasable Competency Definition) or SRCM (Simple Reasable Competency Mapping). RCD is compiled as a standard for consistent and structured description of competencies. This standard makes it possible not only to describe the competencies, but also to share information about them among different automated systems. However, the competence described by natural language are not semantic load. There were occasions when two almost identical competence through their possible lack of semantic analysis recognize by system as completely different. An alternative to standard RCD became standard SRCM, which added RCD logical connections. This would enable to improve the level of understanding of the competencies and their identification. However, ensure qualitative

analysis without full semantic content standard SRCM could not. That is why the most appropriate instrument platform for submission of qualifications and descriptions of educational results are seen with computer ontology.

Note that the idea of using ontologies as a computer instrumental platform semantic representation of a particular subject area is not new. The problem of developing ontological model of distance educational course has become the subject of research A.Danchenko [Danchenko A.L. Development of ontological model of representation of distance educational courses. http://semanticfuture.net/index.php]. Application of multiagent ontological approach to the creation of distributed learning systems considered in the study of I.Keleberdy, N.Lyesnoyi, V.Ryepky [4]. Description of the basic concepts and architecture of Semantic Web as a basis for the operation of public education systems carried out in [2]. Problem of ontologies and their use in computer systems considered V. Lapshin [Lapshin V.A. Ontology of computer systems. http://www.rsdn.ru/article/philosophy/what-is-onto.xml.]. Researchers M.Ronketi and Y.Sant proposed strategy of management training programs (Curriculum) based on ontological approach [12]. Application ontological approach to representation of competencies is presented by H.Pakket [11]. The study [13] devoted to building of ontologies in non-formal and informal education.

As can it be seen from the analysis, these works are completed on specific aspects of using ontological approach in educational systems. However, the use of ontologies as a computer instrumental platform framework of qualifications was not the subject of a separate study.

Ontology for T.Hruber, is a description of declarative knowledge in the form of classes of the relation between them. Drawing describe declarative knowledge usually requires extensive work and certain skills. In the notation of this work and its outcome T. Gruber introduced a special term “conceptualization”. Description he called the “specification”. Thus, ontology, according T.Hruber defined as specification of conceptualization [Gruber T.R. The role of common ontology in achieving sharable, reusable knowledge bases:. http://www.cin.ufpe.br/~mtcfa/files/ 10.1.1.35.1743.pdf].

As researchers N.Noy and D.McGinnes believe, ontology – is a formal explicit description of concepts subject area (classes), properties of each concept that has different qualities and attributes of concepts (properties, roles, slots), the restrictions attached to the property (facet). Ontology form together with a set of individual instances of classes the knowledge base [Noy N., McGuinness D. Ontology Development 101: A Guide to Creating Your First Ontology. Stanford Knowledge Systems Laboratory Technical Report KSL - 01-05 and Stanford Medical Informatics Technical Report SMI - 2001-0880, March 2001:. http://protege.stanford.edu/publications/ontology development/ ontology101.pdf].

Note that the main causes of the development of ontology are:

- the need for analysis of the subject area;
- the need to share human and software agents;
- the need to reuse of knowledge in the subject field.

Often, domain ontology is not the purpose on itself. According to researchers N.Noy and D.McGinnes, developing ontology is similar to the definition of a set of data and their structure for other programs. Methods of problem solving domain-independent software agents are used as data ontology and knowledge base, based on these ontologies.

The development of ontologies involves several steps:

- identifying industry and scale of ontology;
- exploring options to reuse existing ontologies;
- establishing of important ontology terms;
- defining classes and class hierarchies;
- clarify the properties of classes - slots;
- defining facet properties;
- creating instances [Noy N., McGuinness D. Ontology Development 101: A Guide to Creating Your First Ontology. Stanford Knowledge Systems Laboratory Technical Report KSL - 01-05 and Stanford Medical Informatics Technical Report SMI - 2001-0880, March 2001:. http://protege.stanford.edu/publications/ontology development/ ontology101.pdf].

Among the most well-known design of ontologies called KIF (KnowledgeInterchangeFormat), DAML+OIL (DARPA AgentMarkupLanguage) and OWL (OntologyWebLanguage). However, as noted by the most researchers for today the most advanced representation ontology language is OWL (WebOntologyLanguage).

Ontology, based on OWL, is a sequence of axioms and facts with the addition of references to other ontologies involved in it.

To create and edit ontologies it is created a number of specialized development environments, editors, parsers and tools combining ontologies, the most effective ones are: KAON [http://kaon.semanticweb.org/], OntoStudio [http://www.ontoprise.de/en/products/ontostudio/], Ontosaurus [http://www.isi.edu/isd/ontosaurus.html], OpenCyc [http://www.opencyc.org/].

Among these tools for building object-oriented ontology highlight editor Protege-OWL [http://protege.stanford.edu/ overview/protege-owl.html] as flexible, independent from platform environment with the

features and benefits that provides a visual, easy-to-use graphical user interface, implements scalable, ie modular building systems within a unified architecture enables building architecture by further developed routines – plug-ins.

Also Protege-OWL lets you describe classes using the new features. Particular language OWL (OntologyWebLanguage) has a large set of operators and is based on a logical model that allows to define the concept as they describe, because of complex concepts in the definitions can be created from simpler. Moreover, the logical model allows the use of reasoning mechanisms (Reasoner), which also allows you to check whether assertions and definitions in the ontology do not contradict each other and whether the definition of certain concepts. This mechanism is supported by the hierarchy of ontology correctness.

By carrying out a description of all classes, properties, constraints, and objects subject area, we obtain a knowledge base that is essential for the functioning of ontological systems capable of operating over information, including comparable qualifications.

Conclusion.

Computing ontology is an effective instrumental platform to ensure transparency of the European and national qualifications frameworks. With the help of developed computer ontologies will be establishing the balance of European and national qualifications frameworks, the process of comparison of qualifications become easier and procedures for their recognition simplified.

It is supposed directly to develop themselves computer ontology of European and national qualifications frameworks.

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INCLUSIVE PHYSICAL EDUCATION OF FIRST–THIRD GROUP OF HEALTH

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Annotation. Objective: to identify the main trends of inclusive physical education pupils first–third groups of health in secondary schools in Ukraine in modern conditions. The analysis and synthesis of data from more than 150 literature sources. It is revealed that there is still not achieved an adequate interpretation of the essence of the term "inclusive physical education". It is proved that the children of third group of health meet concept of inclusive physical education. It was found that physical education students remains segregative. Experts recommended separate sessions for healthy students and students and special preparatory medical groups. The problem of inclusive physical education is accompanied by a number of unresolved issues. Theoretically expediency social importance and timeliness of implementation of inclusive physical education pupils first–third groups of health.
Keywords: inclusion, education, pupils, health.

Introduction.

According to various sources to a special medical team directed from 3.92% (Kalynychenko I.O., Polka N.S., Zaika L.M., Tolokolnykov A.Y., 2008) to 57% (Weiner E.N., 2010). Although quantitative data are different, but all specialists in schooling observed tendency to increase the number of students aimed to special medical group by reducing the number of children of primary and preparatory medical groups. So in the first class at school to special medical team guiding 5-6% of children, at high school – every third student, and among students, this figure is growing rapidly [6]. Linear approximation of such dynamics allows to predict that soon almost completely healthy make up a tiny part of a contingent of school children. The steady increase of the number of children who are sent to special medical team determines the relevance of the reorganization of school physical education.

The degree of involvement in society of persons with special needs, level of decidability of problems of their habilitation and active adaptation, development for the benefit of society serves as one of the indicators of the current level of development of the state of humanity. One way to solve this problem is the development of inclusive education in Ukraine.

Inclusive education is a modern innovation trend that has been widely discussed in academic circles, educational and civic communities. Despite the growing scientific interest in inclusive education in the world, in Ukraine is just started a state experiment with teaching children with special needs in a general area. It is implemented in the following two areas: integrated and inclusive education.

The first direction – ***integrated*** education of children with features of psychophysical development provides that at school is organized special classes compensated type for children with specific disabilities in development. In their free hours pupils with disabilities in the psychophysical development together with healthy peers involved in different areas of school life. Although educational process in these classes is differentiated by curricula, programs, textbooks and accompanied by mandatory employment of correctional unit, integration, yet provides adjustment of children with mental and physical disabilities to the requirements of education system that as a whole remains unchanged and adapted to study for such category of pupils. However, mechanical combination (integration) in a parallel classes for children with special needs and normal development does not mean full participation in the life of class (http://www.rusnauka.com/18_NiIN_2007/Pedagogica/22422.doc.htm).

The second direction – ***inclusive*** education. The concept of inclusion has replaced the concept of "integration". Replacing the term "integrative" to "inclusive" reflects achievement of different level of understanding of the need for change in the process by which children are not only joined together (from «to integrate» – join in whole), but included in society and become a full part of it («to include» – include, to contain a system). Within inclusive model children with various psychophysical disabilities enrolled in regular classrooms, schools with their healthy peers. This model provides for the elimination of any form of segregation, including special classes for those who does not meet the standard conventionally defined "normality". Inclusion adapt the system to the needs of the child. Educational process is carried out by individual programs feasible for children, provides skilled (specialized collection) assistance, medical and psychological support, maintenance assistant (tutor, parents), the use of specific corrective measures that are not used in regular education. Inclusive model assumes that the school is ready to accept different pupils, to take into account individual differences in their educational approaches in the planning and management of all activities of the educational process [12].

Theory, methods and organization of inclusive physical education of various medical groups students remain unresolved, although in our country and neighboring countries accumulated sufficient scientific and methodological material in physical education of students and students with various diseases. Several studies have started to solve the problem of *differentiated* physical education of students considering a number of different criteria: somatotypes (O.P. Skavronskyy, 2010; G.V. Krotov, 2010), physical and psycho-physiological development (V.Y. Yehozyna, 2006; Yu.Yu. Borisova, 2009), biological development (A.M. Sitovskyy, 2008), the educational achievements of pupils (Ya.I. Kravchuk, 2010). Isolated scientific research dedicated to the study of specific aspects of physical education

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differentiated according to the level of physical health and degrees of variation in its state (L.A. Yerakova, 2005; I.A. Tyuh, 2009; V.P. Shulpyna, 2006). However, the locality of objective field of research limits the scope of possible extrapolation.

Analysis of recent research and publications, experience practice found no methodological concepts of a general nature that do not provide scientifically based technology of organizational-methodological methods of inclusive physical education aimed to special medical group in a single process and, consequently, difficult to transform educational state policy.

Research performed under the theme of research for the Ministry of Education, Youth and Sports of Ukraine Order (decree № 1241 from 10.28.11) "Justification of normative base level of physical fitness of students of 5-9 classes of general educational schools" for years from 2012 to 2013.

Aim, tasks, material and methods.

Aim of article: to identify the main trends of inclusive physical education of students of I-III classes of health of secondary schools of Ukraine in modern conditions.

Tasks of research:

1. To determine the nature of the term "inclusive physical education" and justify the legality of it spreading to schoolchildren of 1-3 health groups;
2. To review the status of the issue of inclusive physical education pupils 1-3 health groups in secondary schools;
3. Theoretically justify the feasibility of implementing of inclusive physical education of pupils 1-3 health groups.

The following theoretical methods are used: synthesis, analysis, compilation of literature, were analyzed more than 150 literary sources.

Results.

Inclusion in public relations and inclusion in education today is being promoted as the leading ideology attitudes toward children with *differences in the psychophysical development*. As synonymous to this definition is used terms: children with disabilities, with psychophysical disabilities, children who require correction of physical or mental development with special educational needs, including special needs, the disabled and others. In Ukraine, especially children with disabilities of psychophysical development are identified as children with special needs (http://library.rehab.org.ua/ukrainian/soc/scripnik), that, in fact, does not fully meet terminological notionality. The term "inclusive education" should not be associated with the education of disabled children. Unlike the concept of integration, inclusion considers not only the disability, it covers all forms of diversity (http://doshkilla.blogspot.com/2012/03/blog-post.html). Balanced education, which is based on the principles of inclusive education, suggests that diversity between people is a natural phenomenon [18]. Russian scientists Ye.I. Holostova and N.F. Dementiev noted that "... any person who has a certain deviation from the average normal and due to this phenomenon is independent, different from the other person" [17, p.41]. Feature implies difference, otherness, perhaps uniqueness, individuality and uniqueness [4, 18]. French scientist Lefransua Gee gives such definition: "Special needs is a term used for persons whose social, physical or emotional feature requires special attention and services, the opportunity to develop their potential" [10, p.256]. Expert also notes that these include both children with physical, mental, social differences, and children who have exceptional ability or talent. Commonly used term "children with *special needs* in international legal documents of many country involves the transformation of defects and breaches, deviations from norm on fixing their special needs. Every child has unique characteristics, interests, abilities, has certain special needs, among them educational needs. Recently, an increasing proportion of children faced with learning difficulties, and thus, at certain stages of the school have special educational needs.

Thus, children with special needs, in addition to children with disabilities, experts [4, 10; Salamanskaya Declaration. The framework of action on education of persons with special need, accepted by World conference on education of persons with special necessity: access and quality. Salamanca. Spain, 7-10 June, 1994. - K., 2000. - 21 p.] include also gifted children and children with minor health problems. Thus, children of 3rd health group that are sent to physical education lessons to special medical groups also have special educational needs, and therefore inclusive physical education extends to them.

An important part of inclusive education, which contributes to a number of positive personality traits and physical improvement is physical education. At present there is no official interpretation of the definition "inclusive physical education". Among the research papers devoted to the problems of inclusive physical education should highlight research conducted by Russian scientist Aksenov A. (2011). Although the author in his thesis [1] uses the term inclusive physical education, but does not define the nature of such terminology concepts.

We consider it necessary to interpret "inclusive physical education" as a flexible, individualized system of physical education for children with special needs in a mass school. Exactly this definition of inclusive physical education we adhere to the study.

Unfortunately, physical education of pupils is still segregate. According to the current legal requirements, during physical education lessons children of special medical group combined with practically healthy one only during the preparatory and final part of the lesson. While for the full range of all problems that are facing with physical education in special medical group provided additional physical education lessons (lasting 45 minutes), holding twice a week in extracurricular time separately from the rest of the students. In these lessons the teacher gives students

individual assignments for individual studies, develops individual exercises for general complex morning exercises, advises students on self-control. Teacher and doctor monitor the improvement of health, the changes in physical development and physical fitness.

To more full range of health problems, strong consolidation of knowledge and skills in physical culture provided all possible involvement of students in extra-curricular sports and recreation and mass athletic events. While children with disabilities entirely participate with healthy children in the process of organizing and conducting athletic holidays [15], the participation of students of special medical group in sporting events is limited. The recommended is the direct involvement of these children only in sports and recreational activities focus in mode of school (part of mobile breaks, extra-curricular sports and mass work (holiday trips), but participation in sports is not expected (Physical Culture: A program for special medical group. 5 - 9 classes [ed. V.I. Mayer, V.V. Derevianko]. - K., 2008, Physical Culture: A program for special medical group. 1 - 4 classes. [ed. V.I. Mayer, V.V. Derevianko]. - K., 2005). In mass sports and recreational activities students of special medical group may only participate as organizers, sports judges, representatives of the sports teams, etc. Some experts also believe that students of special medical group can participate and directly compete with those types of physical activity that they are not contraindicated due to the disease, and certain types of events (say on balance) can compete virtually all representatives of special medical group. In order to balance the forces of rivals (with different levels of training) handicaps can be applied. However, programs of inclusive physical education of pupils 1-3 health groups till today has not been developed. Such trends are contrary to world trends of integration and inclusion.

One of the major obstacles to accelerate the pace of implementation of inclusive physical education in Ukrainian schools is the lack of reflection teachers of physical education (redefining personal values, interests, motivations, mechanisms of perception, emotional response, behavioral patterns and drawing attention to the products of their own activity).

Expressed opinions that various features and abilities of students, especially pronounced in the motor area, is an insurmountable obstacle for the implementation of inclusive physical education [5, 7]. Specialists (Bulich E.G., 1986, Volkov S.S., 1991) emphasize the fact that only in a separate physical education classes with students of special medical group can achieve the greatest health effect. Moreover, some experts [7] expressed the idea of particularised physical education of students *preparatory* medical group.

It should be noted that in every other school (59.84%) exists a common practice of students' sessions with deviations in the health of the students and the principal of the preparatory group [2]. Physical education teachers find significant drawback selection of students of special medical group in a separate group and recognize quite possible joint training of students in different medical groups, provided special attention to the children of special medical group (due to restrictions tasks, exclusion reach exercises, increase the time for rest, etc.) [11]. Teachers of physical education with significant experience (10-20 years) of work in secondary school are not afraid to work in mixed classes, while the highest level of negative attitudes towards the implementation of inclusive physical education characteristic of young professionals who have worked in the field of education is not more than 10 years (58%) [9]. Therefore, it is important to implement a strategy of inclusive physical education today that tomorrow athletic university graduates could fully implement it in practice. Teaching in special medical groups is one of the weakest acquired part of theory and methodology of physical education by teachers of physical culture [13]. Physical education teachers admit that they believe their level of preparedness to work with children of special medical group insufficient. Therefore, the problem of the appropriate level of training of personnel requires its own solution.

Proponents of joint physical education distinguish the positive side of inclusive processes for children of special medical groups: the stimulating effect of trained peers, the ability to inspect a wider range of life. As children with special needs, and as at their healthy peers, a positive effect will be development of communication skills and innovative thinking, much less will be cooperation during physical education of healthy children with those who have deviations in health. All these will promote formation in healthy schoolchildren humanity, compassion, mercy, tolerance, compassion, kindness, responsibility, which is an effective means of moral education. In conditions of collaborative learning during physical education lessons with students of special medical group the rest of pupils have higher social responsibility, greater self-confidence, which contributes to their personal development. Expressions of concern about student special medical group, due to his limited capacity, making it so that it is sensitive to its problems, empathy, sensitive and tactful interaction with him, respect as a person and sympathy – all these manifestations of spiritual beauty and strength, factors truly humane, harmonious relationships, high performance of personal development that should be "embedded" with the early school years. In the process of physical education and training formed a real person (http://www.rusnauka.com/18_NiIN_2007/Pedagogica/22422.doc.htm, http://library.rehab.org.ua/ukrainian/soc/scripnik). The common lessons of physical training for children with different levels of physical health will be beneficial for all participants of the educational process.

Thus social significance of inclusive physical education character, probably, represented the widest palette of values. However, besides the social aspect, the importance of an inclusive physical education grounded with two other aspects: educational and economic. There is justification educational character: requirements for inclusive educational establishment regarding joint training of all children means that schools must develop these tailored programs and teaching methods that meet the individual differences of students and thus benefit all children. Numerous variants of presentation of educational material, the use of educational tasks of different difficulty levels (along with traditional), the use of printed materials, films, video and audio recordings, brainstorm, involving peers and volunteers to provide

assistance, two or more lessons, providing information and objectives on handout will favour for easier assimilation and well preparation of children.

From the perspective of inclusive physical education differentiation should apply not only flexible ways of presenting material by teachers (teaching techniques and methods) in the classroom to master diverse student collectives proper curriculum. Differentiation should appear also to create favorable conditions for demonstrating students acquired knowledge and skills, but also to use various means to create incentives and increasing the level of motivation taking into account learning style, needs, abilities and interests of all students. Therefore essential for effective inclusive physical education is to enhance differentiation and individualization of learning content.

There is also an economic substantiation: probably it is cheaper to build and maintain secondary and infant schools, which educate and brought all the children together, rather than create complex system of different types of institutions that specialize in education of specific groups of children. Inclusive institutions that provide effective education for all children is economically more acceptable means of providing education for all (http://doshkilla.blogspot.com/2012/03/blog-post.html). United lessons of physical education for students of all medical groups will save to pay for extra lessons of physical training for special medical group, and redirect funds to other budget measures. In addition, conduct of segregate classes for students of special medical group complicates organizational and methodological support, requires appropriate material and technical equipment of complicated medical monitoring etc.

Therefore, physical education of students of special medical group within the overall process of physical education in school is progressive, humane, socially important and relevant.

Existing methods of completing medical groups (the degree of functional abnormalities, including results of tests Ruf'ye, using G.L. Apanasenko rapid methods) subject to criticism [3, 11]. Therefore, the criteria for completing approximately homogeneous groups of students for the optimal choice of physical activity during physical education lessons still need their improvement.

In the transition from primary to secondary school age there is a critical period of development of organism, which coincides with the beginning of puberty rearrangements in the body and causes students reduce the functional capacity of the physiological systems that manifest as adverse changes in the locomotor apparatus, increasing the number of psycho-emotional stress states and the number of cases were provided [8]. However, the category of students of 1-3 health group of secondary school age almost “fell” out of specialists’ sight.

In methodological literature there is no development of healthy activities in school day and out of school activities for students of different health groups, while in general it is developed methodic of physical culture lesson (I.R. Bodnar, 2005), even compiled (V.S. Yazlovetskiy, 2004; L.M. Kodaneva, 2011) summaries of lessons for students of special medical group. Contents of complexes P.E. minutes and P.E. pause remains traditional at schools, do not taken into account the changes in health and physical performance of students over the past 20 years; the disease inherent to school age; do not apply modern technology that can diversify and differentiate exercise. Hence there is a need of forming a new concept of physical education during the school day.

Debatable questions remain criteria of success of students’ learning aimed to special medical group. Several authors argue that medical-pedagogical control should be designed to assess the dynamics of physical fitness of students, other professionals [16] measure the effectiveness of lessons consider improving the functional status of organs or systems weakened by pathological process. It is proposed integrated approach in evaluating the performance of efficiency of the physical education of primary school age children [14] and students [3]. Sazhnyeva O.V. recommended to evaluate the effectiveness of physical education for a number of functional state of the major body systems, as well as tests to determine the strength, endurance and coordination skills. Vrzhesnyevskyy I.I. justifies integrated assessment based on consideration of other above mentioned, and such factors of groups as morbidity and lifestyle.

There is no single approach to determine the level of physical fitness of students of special medical group. Because some test exercises are contraindicated in certain diseases, not all exercises offered in the literature can be used in physical education in special medical group.

Conclusion.

Today there is not achieved adequate interpretation of the essence of the term “inclusive physical education”. Often it is seen only as part of inclusive education of children with disabilities. However, the concept of inclusion encompasses all forms of diversity of children's group: from children with mental and physical disabilities to talented and gifted children. Thus, children of 3 health group that are sent to physical education lessons to special medical group, also consistent with the concept of inclusion and require the implementation of inclusive physical education.

Physical education students of special medical group remains segregate, despite the global trend of active promotion of inclusive education. Experts along with the celebration of positive economic, humanistic and educational components expressed reservations about the complexity of (and sometimes impossible) implementation of inclusive physical education for children, features which are very different. Therefore, they recommended some lessons for healthy students and special students, and even preparatory medical groups.

Implementation of inclusive physical education of students of 1-3 health groups believe socially important and timely. Today, however, the problem is accompanied by a number of unresolved issues: despite some accumulated experience for today, absence of *concept* of organization and formation of content of inclusive physical education of pupils of 1-3 medical groups, requires scientifically sound *technology* of inclusive physical education in secondary

schools, absent even definition, *programs* of physical education of students with disabilities in varying degrees of health, absent information about specific features of adaptation to physical education in *middle school age students* with different levels of health; requires further improvement *system of accounting performance and test of physical preparation* of students of school age, aimed to various medical groups; requires better system of *recruitment* of medical groups, requires improving *staffing* of inclusive physical education students from different medical groups, the methodology of *extracurricular* sports and recreational activities in the mode of the day, week, year are not developed.

Solve these problems will focus our *further scientific research*.

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GROUND OF MAINTENANCE OF MODEL OF HEALTH OF SAVING TECHNOLOGIES OF STUDENTS OF THE SPECIAL MEDICAL EDUCATIONAL SEPARATION OF PHYSICAL EDUCATION FACILITIES

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Annotation. The psychological pedagogical problems of physical development of students are considered with a rejection in a state of health. Experience of physical education of students of task medical force is studied. The structural functional model of process of physical education of students is developed with the use of health of saving technologies. Over 5000 students took part in researches. It is set that morphometric indexes are most closely associate. Intercommunications of indexes of level of development of physical qualities specify on insufficient differentiation in mechanisms which determine the structure of physical preparedness of students. Recommendations of model physical possibilities of students are resulted. Models are instrumental in an estimation individual potential possibility of organism. Models allow to utillize information for planning and leadthrough of a health educational educate process on physical education. Possibilities of determination of volume of the physical loading are shown taking into account a floor, nosology of diseases and state of physical preparedness of students.
Keywords: health, technology, model, students, physical, education, facilities.

Introduction.

The restructuring of higher education in Ukraine provides fundamental and comprehensive improvement of training future specialists for the national economy. Physical education in the educational process of the institution is a tool that solves one of the parties to such training, promoting individual development of student development and improvement of its professional-skills and qualities [2, 3, 10, 11].

Implementation of effective physical education of students in Ukraine is an urgent problem whose solution is essential for the development of society and the state, production, physical and spiritual development of the young generation in the present and in the future [4, 8].

The systems theoretical-methodological and empirical analysis of the literature on the issue of physical education of students of special medical groups in higher educational institutions of Ukraine gives grounds to assert that physical education has traditionally recognized and proved an important factor in ensuring the capacity of students, effective formation of its nosological health and preparation for active life and future high-performance work [1, 6, 9].

It is shown that the level of health as a result of interaction with the environment is constantly fluctuating: health – a dynamic attribute of human life: when person is sick, then the level of his health reduced (sometimes to zero – death), when person is recovering – the level of health increased, but never reached full health. Any recovery – is a new health.

Thus, the culture of health – is internally recognized human need to support, strengthen and improve their physical, mental, emotional, reproductive, social, personal and spiritual health.

Students' life takes place in an ever increased nervous tension. Scientists and educators say the constant increase in the number of school and university students, which have a higher anxiety, self-confidence, capabilities, and emotional instability. Personal anxiety has a negative effect on behavior, attitude in society, success in learning, and the development of adaptive capacities of students in high schools [1, 5, 7]. Dynamic of kinds of disease among first-year students is increasing every year, as evidenced by performance on NUB&N of Ukraine according to the student clinic data (Fig. 1).

Aim, task, materials and methods.

Aim of work – to develop a model, theoretically justified and experimentally verify the theoretical and methodological foundations of health saving technologies in physical education of students of special medical group of higher educational establishment.

Tasks:

1. To make theoretical and methodological analysis of the problem of physical education functioning of special medical groups students in higher educational institutions of Ukraine.

2. To identify the impact of health saving technology on physical health, morphofunctional state of students of special medical groups.

Methods of research. To attain these objectives the following methods were used, namely: analysis and synthesis of scientific-methodical and professional literature, teacher observations, pedagogical experiment, the methods of determining the functional state of the organism and the level of physical fitness. Qualitative and quantitative analysis of the processing of the results of the experiment carried out by methods of variation statistics: correlation, regression, dispersive and factor analysis, t-criterion of Student and F-criterion of Fisher with the aim of evaluation of physical condition of students, test the effectiveness of formative experiment.

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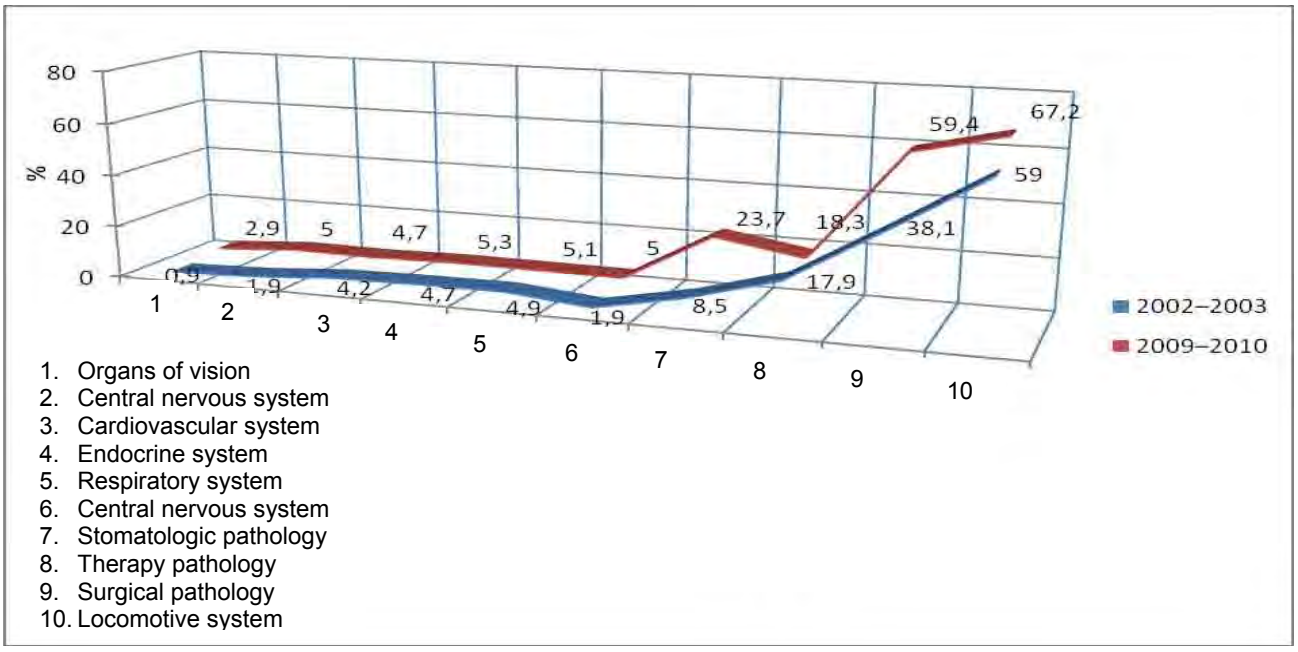

Fig.1. Comparative characteristics of disease among I-year students of NUB&N of Ukraine during 2002-2003 and 2009-2010 educational year, %

Organization of teaching experiments. Participation in the experiment took more than 5166 students male and female, which were carried out on the basis of NUB&N of Ukraine (n-3625) KSAM (n-481), NUKHT (n–415), NTUU „ KPI ” (n–373), PF „KATY” NUBiP Ukraine (n–272) with the support and participation of teachers of mentioned universities.

Results.

Collegiate recognized that model (Fr. modele – sample) – is an imaginary or logistic implemented system that displays or plays the object of study (natural or social) and can modify it so that it study provides new information about this object. Lets describe the main components of the proposed ideal representation of the process of physical education of students of special medical groups by means of health saving technologies.

Target block of model contains the following components: *goal* – to provide students of special medical groups an opportunity to improve and promote health during the study period and in later life, to improve their physical fitness; *main tasks* – forming at students of special medical groups active and positive motivation for health-training exercise; the formation of knowledge system about physical culture and healthy lifestyle; improve health, promote correct formation and full development of body, prevention of diseases, ensuring a high level of physical condition and ability in the course of training; mastering the system of practical skills and training by basic types and forms of rational physical activity, formation, storage and improve health; acquiring the ability to perform state or departmental tests and norms at the requirements of educational qualification characteristics, etc. The purpose and objectives of the proposed physical education of students of special medical groups determined by modern *social requirements* for university graduates, declared in educational standards.

Developed model of physical education of students of special medical groups provides functioning of a process on the basis of realization a number of *methodological approaches and principles*. Methodological approaches (theories, concepts, hypotheses) in our study reflect the initial, key fundamental teaching position that have general scientific meaning of construction a process of physical education of students of special medical groups, ensuring its focus on the creation, preservation, enhancement and improvement of future health professionals (system, competence, active, student-centered).

Systematic *approach* to physical education of students of special medical groups provides an opportunity to explore this phenomenon as a complex, multi-level process that is constantly evolving and has a certain structure. On the other hand, the methodology of systematic approach provides combining together forms, methods and means of health saving technologies enables the construction of a model of definite process as methodical system.

Competence *approach* to physical education of students in the context of international considerations associated with the ability to act, actually live in a modern society. First of all, this educational methodology aims forming at personalities such abilities: autonomous (independent) action (the ability to protect and take care of correspondence, rights and interests of others; formulate and implement personal projects), interactive use of means (interactive ability to use language, symbols and texts; knowledge and information literacy; new interactive technologies), the ability to function in socially heterogeneous groups (the ability successfully interact with others, cooperate; resolve conflicts).

It is important to point out those competencies that by decision of the Council of Europe must be formed among young Europeans, in particular:

1) political and social competence – the ability to take responsibility, participate in group discussions, to resolve conflicts peacefully, to participate in building a democratic society;

2) competence, associated with life in a multicultural society – based on tolerance education should cultivate in young people the ability to recognize and accept differences, respecting others, learning to live with people of other cultures, languages and religions;

3) competences regarding possession of spoken and written communication, including knowledge of more than one language;

4) competences associated with the development of information society – possession newest information technologies, understanding of the opportunities and ways to use, strengths and weaknesses, the ability to critically perceive information broadcast by the media;

5) the ability to learn is the basis for lifelong learning in professional and social contexts.

Thus, using the competency methodology to physical education of students of special medical groups with different levels of physiological capacity of the organism have to use the following educational technology (in this case health saving technologies. – S.P.), that will improve, enhance and perfect health of future professionals, to form the ability of practical solutions of life problems and bring everyone to the level of physical preparation in accordance with the requirements of educational qualification characteristics.

Activity *approach* to physical education of students of special medical training department allows solving a large amount of educational, recreational and educational objectives. The main conceptual thesis of activity approach to development of personality of the student is that the individual discovers the properties and relations of elements of the real world only during activity – mental or physical, individual or collective, etc. It is generally accepted that activity – is a way of being human, it is his behavior to meet a variety of needs, motives and goals. Focusing on the provision of activity-methodological approach can be argued that physical education is effective only when the student (apprentice) included in the various activities and possession of physical education, knowledge, skills, develops the need to exercise, motivation of active way of life. The above implies for the solution of improving training and professionally-applied training a combination of theoretical, methodological and practical component in the implementation of components of health saving technologies for this category of students. In addition, we anticipate attracting students of special medical groups to various forms of physical improvement process – mandatory training, electives, independent exercises, small forms of active recreation during the course of theoretical studies (micro pauses, P.E. minutes and P.E. pauses), participation in various sports and sporting events, a variety of games, etc.

The essence of ***person-oriented*** *approach* [6] is to overcome the contradiction between collective education (for all) and education "for everyone" based on an appeal to the personality of the individual consciousness, life experience, their own creative potential. Features of mentioned methodology is that it seems to be accumulating several approaches: is a man-center, directs on a human as the goal of education (axiological approach); supports and develops the subjective quality and individual characteristics of the student (individual approach); introduces students to the world of cultural heritage of mankind (cultural approach); stimulates the student to self-solve their life problems in unstable social conditions of life (synergistic approach).

It is important that the provisions of person-oriented approach should encourage the person to self-knowledge, self-activity so that every student could become a creator of his own spiritual life (including health). Thus on the front fore educational situation of creative cooperation, aimed at maximum involvement of all components of the structure of personality (mind, will and emotions) to implement independent search and constructive ways of social behavior.

The unity of all these methodological approaches provides adequate problem solving of improvement, preservation, enhancement and improvement of the health of students of special medical groups during the study period and in later life by means of health saving technologies with a set of *principles*. The above set of norms, basic rules of realization of physical education of students of special medical groups in the study was seen as a construct "pyramid" type: the basic principles of national education of students; further general-methodological principles; then the principles of physical education of students; on top of the pyramid – the specific principles of physical education of students of special medical groups.

In physical education of students important role takes the formation of knowledge systems of physical culture and healthy lifestyles. The effectiveness of this process is achieved while respecting the general methodological principles – highlight that define the content, organizational forms and methods of implementation of health saving technologies, including:

• *the principle of consciousness and activity* (adjusts to the formation of students' strong interest in exercise and sports; awareness by students healthy influences on organism of active physical activity contribute ground learning of physical education, accelerate the process of physical perfection);

• *the principle of visibility* – requires build educational process involving a variety of feelings to the process of analysis and perception of educational information;

• *the principle of systematicity and consistency* – the regularity, consistency, continuity of systematic nurturing of ensures the efficiency of formation of physical education students;

• *the principle of repetition*: as a result of multiple repetitions produced dynamic patterns, the nature of the elements can show a change in exercise or conditions of their implementation in a variety of methods and forms;

• *the principle of accessibility and personalization*: using nature's date of student, teacher guides the direction of physical development. This excludes the negative and harmful consequences for the student body as a result of excessive demands and tasks;

• *the principle of cycling*: contains that class of cyclically repeated that promotes better preparing of students for the next stage of each study;

• *the principle of communication of theory with practice* at the level of physical education invoke to teach students formation, maintenance and promotion of health in practice, use knowledge in daily activities of a healthy lifestyle.

Specific principles that ensure implementation of health saving technologies in physical education of students of special medical groups in the study justified (Section 2.2, p. 98-101) the following basic requirements:

• recreational, therapeutic and prophylactic use of orientation of physical education;

• differential approach to use physical culture, depending on the nature and consequences of structural and functional abnormalities in the body caused by the pathological process;

• vocational and applied orientation classes in physical education;

• education of motivation of students to use exercise to enhance physical and mental health and improve physical fitness by means of physical culture and natural factors.

The study identified and justified such *pedagogical conditions* of physical education of students of special medical groups:

• consistent of teachers of physical education position, health care workers and administration faculties (deans, their deputies, chief academic part of educational work, etc.) for planning sessions with students of special medical groups, the definition of control health and level of physical fitness;

• optimization of forms of physical training in which basic forms (classes in physical education, independent physical exercise, etc.) naturally combined with variation forms (hiking weekend, small forms of recreation, etc.) and independent theoretical work (papers) whose content is to be used to develop individual health and training programs based on nosology disease of author;

• consideration of health, disease nosology of students of special medical groups in choosing forms, methods and means of health saving technologies for their physical education;

• deliberate use of health saving technologies while teaching in all cycles of future professionals in higher education;

• close cooperation of teachers and health workers on rational use of physical culture and sports, effective drug control in conjunction with educational assessment of processes of improvement, preservation, enhancement and improvement of health of students of special medical groups (regular medical examination, medical and teacher observation of classes, sports and recreational activities, competitions, the hygienic control; medical health of health and sports camps, sports and health and sports events, competitions; health and educational work and health promotion, prevention of illness, injury, etc.);

• providing emotional appeal to lessons on physical training through the use of folk games, expanding arsenal of exercise, messengers for playing at home;

• targeted attraction of students of special medical groups to recreational sports and sports weekly activities (morning gymnastics, walking distance to the university, teaching classes in physical education, recreation during the school day; activities during homework; independent health and fitness classes; participation in sports and sporting events, etc.) with the prospect of a weekly motor mode from 17 to 20 hours;

• combination of formal (specially organized) physical education with self-education, in which physical self-improvement of students of special medical groups based on the use of methods of self-influence (self-organization, self-reassurance, self-command, self-hypnosis, self-programming, self-inspection, self-correction, autogenic training, self-quieting, self-praising, self-oblige).

In structural-functional model of process of students' physical education of special medical groups health saving technologies implemented through the following *forms*: training sessions in physical education, independent physical education study, sports and tourism, and sports activities, exercise in the daily routine, homework in physical training, etc. In turn, training sessions are held in usual (reproductive and productive) ways of training, the main ones are: narrative, explanation, discussion, debate, problem methods (statement of the problem, partially-search, research), simulation, design, practical, video-method, work with educational and scientific literature, etc. In addition, specific of health saving technologies of physical education with students of pointed category reflect the following methods: standard-repeated exercise; variable exercise; gaming method.

The basis of *content* of physical education of students of special medical groups is a system of knowledge and skills of theoretical, methodological and practical training, optimized for the complexity of the disease of student in terms of his health and so on.

Diagnosis-resulting block of model provides assessment, analysis and correction of results of physical education of students of special medical groups and involves complex medical and biological indicators of physical development of the individual, morphological and functional properties of the organism (mass growing index (Ketle); power of hand (dynamometry); attempt to hold breath – test Shtange, sample Ghenci, vital capacity of lungs; heart rate (HR); blood pressure, etc. In order to determine the level of physical and functional preparedness of students of studied groups it is conducted the survey respondents, testing their physical skills (running, jumping, pulling, etc.).

Comprehensive indicator of the level of health, physical preparation was chosen index, which characterizes the relationship of biological age to calendar age of the student. These indicators characterize five levels of health and physical preparation of students as a result of the proposed health saving technologies in educational process of higher education. The predicted *result* of realization of model elements is shift in the levels of care (reduction of biological age) of students in this category, advanced level of theoretical, practical and methodological types of physical fitness.

Thus, the proposed structural-functional model (Figure 4.18) of a process of physical education of students of special medical groups, in our opinion, can be used for in-depth fundamental research challenges of training and education of students. Moreover, as shown by the results of experimental work, designed construct of process of physical education of students of special medical department in its implementation in practice helps to reduce biological age, to improve health of students, change in the levels of care (reduction of biological age) of students category, advanced level of theoretical, practical and methodological types of physical fitness.

So, to solve the problem to improve the physical health of students for special medical educational department purely medication it is impossible – it is needed pedagogical tools and teaching methods. Therefore, the main burden of its solution relies on the department of physical education and scientific and educational workers, who work with them, because they engaged in shaping the worldview of the student and motivation to enhance their health by means of physical education.

Analysis of scientific literature gives reason to say that physical education, recreation and sports educational technology as a part of the public education system, should lay the foundation and development of physical and mental health, a comprehensive approach to the formation of students of special medical training department healthy lifestyle.

Conclusion.

1. Analysis of the interactions of components of physical development and physical fitness of students of special medical groups showed that morphometric parameters are most closely interrelated. Relationships of indicators characterizing the level of development of physical qualities reflect as two-way influence as lack of differentiation in the mechanisms that determine the structure of physical fitness of students with impaired health.

2. Recommended models of physical capabilities of students of special medical departments help professionals to assess individual potential of the body in the field of physical education, using available information during planning and improving the educational process in physical education, determination of physical activity according to sex, nosology of diseases and condition of physical preparedness. Keeping a diary of physical self-affects influence on education of their motivation for regular exercise, which in turn helps to ensure a normal life, success in learning and mastering the skills of future profession.

3. Further research of reserve capacity of the motor activity of students with disabilities in health, we see the following:

a) finding a new ways to improve the structure of physical fitness – relationships and interactions of physical abilities, motor skills and physical development indicators;

b) search for new, most effective ways to improve mechanisms of management motor activity of students;

c) clarify and improve of relevant predictive mathematical models, normative assessment scales of transferable skills of students of special medical department;

d) development of specific, differentiated according to nosology programs in physical education and content modules designed to enhance motor skills and backup capabilities taking into account specific of a particular disease and individual level of physical fitness.

4. The content model using of health saving technologies during educational process of students for special medical training department by means of physical education.

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CORRELATION OF PHYSICAL AND FUNCTIONAL OF CARDIOVASCULAR YOUNG FOOTBALLER 14-16 YEARS

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Annotation. In a competition period were studied the indexes of general and special physical preparedness of young footballers aged 14 - 16 years old. On the basis of research of electrocardiograms dependence of indexes of physical preparedness of young footballers is presented on functional possibilities of the cardiovascular system. It is set that the dynamics of development of physical qualities of young footballers has heterochronic character. The level of physical preparedness of sportsmen is recommended to check on such by tests: at run on distance 15, 30, 60 meters from a place and 15 meters with to motion (for the estimation of speed motive qualities), at run on 400 meters (estimation anaerobic - to glicolic endurance); broad jump from a place, triple and upwards (estimation of dynamic force), at run on 3000 meters or during 12 minutes (estimation of aerobic endurance). The integral criterion of the special preparedness of footballers are competition performance indicators during a season (16 matches).
Keywords: young people, footballers, physical, preparedness, electrocardiogram, systole, volume, minute.

Introduction.

Modern youth football developed through increasing requirements for all aspects of training of young players [6, 9]. In the process of competitive activity body has significant magnitude and duration of exercise, which require maximum mobilization of the organism of young athletes and place high demands on their preparedness. Therefore, the important task of training process is scientifically justified increase of general and special physical fitness of young football players according to the functionality [11, 13].

Competitive activity in modern football is characterized by significant increase in physical and mental stress, due to increased competition and large number of events.

So, an interest of football specialists cause requirements for general and special training [2, 8, 20]. Currently it is suggested many ways to assess the readiness of special players in competitive period, which are widely used in the process of observing the game of adults and young players.

The purpose of control according to V.M. Platonov, is an optimization of preparedness process and competitive activities on the basis of an objective assessment of various aspects of preparedness and functionality of major body systems [14]. It recorded a variety of factors as competitive and training activities, as well as the parameters of the functional state of the athletes [3, 5, 15, 17, 21]. Only in this case, we can correlate and analyze their significance. Results of the analysis provide the opportunity to develop programs and plans for training or make appropriate adjustment to their implementation [13, 21-23].

The study was conducted in accordance with the theme of research of department of football of Lviv State University of Physical Culture for years 2011 - 2015 “Scientific and methodological foundations of improving training of athletes in football with the peculiarities of competitive activity” of Consolidated Plan of research in the field of Physical Culture and Sports of Ministry of Ukraine of Family, Youth and Sports affairs.

Aim, tasks, materials and methods.

Aim of research - to examine and analyze the performance of general and special training of young players and the functional state of the cardiovascular system after exercise.

Object of research: the process of physical training and its effect on cardio-vascular system of young players aged 14 -16 years old.

Purpose of the study: the relationship of indicators of physical preparedness and functional state of the cardiovascular system of young players aged 14 - 16 years old.

Research objectives: to analyze the performance of physical preparedness, physical development and functional status of young players aged 14 - 16 years old in the competitive period.

Methods and organization of studies.

1. Theoretical analysis of specific references.
2. Testing of physical preparedness of players.
3. Teaching observation.
4. Analysis of competitive technical and tactical actions.
5. Anthropometry.
6. Functional tests.
7. Methods of mathematical statistics.

Research was carried out on a group of young footballers aged 14-16 years of SCYUSSHOR - 4 of the city Lviv in years 2010-2011.

In the process of preparedness of young players it is necessary to consider their physical development, functional, psychological state, physical preparedness [2, 5, 6, 10, 15]. During the study we established indices of physical development, functional, mental health of young footballers aged 14-16 years (Table 1).

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In theory and practice football it is isolated settings of general and special physical training of young players aged 14-16 years [2, 6].

Table 1

Indicators of physical, functional, mental state of young players aged 14-16 years.

№	Type of preparedness	Control indicators	Indicators of preparedness (ages)		
			14 years	15 years	16 years
1.	Physical development	Mass of body (kg)	55,9±3,2	55,9±2,8	65,5±2,5
		Height(cm)	165±2,3	170±3,1	176±1,2
		Lung vital capacity (ml)	3900-4100	4500-4600	4800-5000
		Main force	100-120	120-140	150-160
2.	Functional state	PWC 170 (kgm/min/kg)	1400-1600	1600-1850	1800-2000
		MCK (ml/kg/min)	50-54	54-56	55-57
		ПАНО heart rate	145-155	155-160	160-170
3.	Psychological state	Courage	6,1	6,8	5,9
		Anxiety	3,9	4,5	5,9
		Emulative emotional stability	- 2,5	- 1,0	+ 0,1
		Sport motivation	1,0	0,5	2,1
		Stability	0	1,04	1,5

The level of physical preparedness of young athletes tested according to the following benchmarks: running at a distance of 15 m, 30 m, 60 m up and 15 m on the move (to assess the speed of motor skills), running at 400 m (estimate anaerobically–glycolytic endurance); broad standing jump, triple and up (estimate of dynamic power), running at 3000 m, or during 12 minutes (estimate aerobic endurance) [2]. The integral criterion of specially trained players are indicators of competitive activity, which averages during the season (16 games) are presented in Table 2.

Along with indicators of physical preparedness for determination of readiness for competitive activities of players an important are indicators of the functional state of the body, including the cardiovascular system [7, 15, 17]. Cardiovascular system, especially in boys, is one of the most vulnerable functional systems in the development of adaptation to high physical loads [3, 4, 10, 16, 18]. Systematic training causes an increase of left ventricle [16].

Table 2

Indicators of physical preparedness and competitive activities of young players aged 14-16 years (n = 20).

№	Types of preparedness	Control indicators, unit of measure	Indicators of preparedness, ages		
			14 years	15 years	16 years
1.	General physical preparedness	Standing running 15 m, c	2,5±0,3	2,4±0,2	2,3±0,2
		Running 15 m, c	2,1±0,2	1,9±0,1	1,8±0,1
		Running 30 m, c	5,0±0,4	4,8±0,2	4,5± 0,3
		Running 3x10 m, c	8,0±0,4	7,8±0,4	7,6±0,1
		Running 50 m, c	8,5±0,2	8,2±0,1	8,0±0,1
		Running 7 x 50 m, c	71,0±1,2	70,0±0,8	67,0±1,1
		Running 400 m, c	68±1,8	66±1,2	65±1,4
		Running 12 min, m	2850±43	2900±38	3000±18
		Long standing jump, cm	220±8	230±5	235±6
		Triple jump, cm	610±12	640±9	650±9
		Standing jump up, cm	38±2,1	40±1,8	42±1,6
2.	Special physical preparedness	Dribbling 30 m, c	5,8±0,12	5,6±0,18	5,3±0,14
		Kicking on ball on a distance, m	55±4	65±5	70±1
		Throw a ball on a distance, m	16±2	17±1	19±1
3.	Competitive activity (special preparedness)	Number of technical and tactical actions (TTA: short, medium, long passes, dribbling, hitting, selection, interception)	50-45	55-50	75 - 65
		Rejection rate (%)	34-32	34-32	40-35
		Dynamic movement in game, m	750-1000	850-1100	900 - 1200

Functional reserves of the cardiovascular system of children and teenagers are much lower than in adults [4, 18, 19]. Nervous and humoral mechanisms of effects on the cardiovascular system are not yet fully formed. Not improved of cardiovascular system is largely limits the possibility of long-term performance of children of heavy load, which often results in young athletes to overtraining and overexertion [4, 18].

Table 3 shows the changes of electrocardiogram in teenagers after exercises [17]. The nature of ECG changes after exercise reflects patterns of bioelectrical activity changes on early restitution.

Inconsistency in several changes of ECG intervals duration, amplitude and width of the teeth, rhythm, degree of reduction in the duration and cardiac cycle due both heterochrony in the relevant processes, and violation of the biochemical processes in the myocardium [18].

An important indicator of the functional state of the cardiovascular system is hemodynamic performance. According to some authors systolic blood volume in young athletes is much higher than systolic blood volume at their peers not sportsmen [3, 16, 19]. Other authors regarded the reduction of systolic blood volume at rest in young athletes, along with a decrease in heart rate as an indicator of economizing impact of exercises [16, 8]. Similar data were obtained by different authors, about minute volume of blood, volumetric flow rate. Abrosimova L.I., Karasik V.E., 1991, indicate, that the best option in response to regular physical activity is to reduce the resting volume flow velocity in the peripheral blood vessels [1], and increasing of minute volume of blood with a moderate increase in heart rate that responsible to isotonic type of hyperfunction of the heart according to F.S. Meyerson [12] and regarded as one of the most important features of economization of cardiac activity during physical exertion.

Table 3

Variations of ECG changes after exercise at teenagers involved in sports

№	Indicators of ECG	Зміни показників		
		Помірні	Виражені	Неадекватні
1.	Duration of cardiac cycle	Decreases proportionally to performance indicators	Decreases disproportionately to performance indicators	Significantly shortened disproportionately to performance indicators
2.	Heart rhythm	Stored sinus rhythm	Stored sinus rhythm	Appear extrasystoles and transverse and longitudinal blockade
3.	Respiratory arrhythmia	Disappears with increasing heart rate by 50% compared with the state of tranquility	Disappears with increasing heart rate by 25-30% compared with the state of tranquility	Grow or appear respiratory arrhythmia
4.	Electrical axis of heart	Shifted to the right to 30° or left to 5°.	Shifted to the right more than 30° or to the left to 15°.	Significantly shifted to the right more than 50° or to the left more than 15°.
5.	Electrical axis of teeth P, T and complex QRS	Unidirectional sliding right. The angle of divergence of electric axes of tooth T and complex QRS decreased or unchanged	Unidirectional multidirectional to axis of teeth P, T and complex QRS. The angle of divergence of electric axes of tooth T and complex QRS increase to 15º.	Unidirectional multidirectional to axis of teeth P, T and complex QRS.
6.	Intervals PQ, QRS and QT	Do not change or shorten proportionally to response of heart rate. QT interval shortened in proportion to heart rate response and its actual value is abnormal.	Shortened disproportionate response and performance indicators.	Increases the duration of intervals PQ and QRS. The discrepancy between actual and normal QT duration is more than 0.04 sec.
7.	Segments P – Q and S - T	Occur synchronous offset of segment P - Q and S - T to 1 mm below the baseline.	Occur synchronous offset of segment P - Q and S - T to 1,5 mm below the baseline.	Occur an isolated offset of segment S - T below the baseline.
8.	Tooth T	Amplitude does not change or changes only slightly.	Amplitude varies significantly.	Appears negative tooth T in the positive leads.

Adaptation of the cardiovascular system for hard muscular work in young athletes depends on age. So, at the age of 11-12 years adaptation of the cardiovascular system to veloergometry stress manifested in accelerating of cardiac activity with little change in systolic blood volume. And in young athletes of 13-14 years a character of adaptation is different: although the increase in heart rate is a major factor in the reaction, more noticeable increases systolic blood volume, especially increasing of training and sports qualification of teenagers (Table 4).

This suggests about reinforcement of positive inotropy of heart, increasing its capacity to create a new level of functioning of the cardiovascular system.

Table 4.

Systolic blood volume (ml) at boys of 11-14 years with significant cycle loading

№	Age of children	Not sportsmen X±Sx	Sportsmen X±Sx
1.	11-12 years	71,3± 7,3	93,8±6,5
2.	13-14 years	84,5±8,4	90,7±6,4 (3-class) 95,4±6,2 (2-class) 120,2±7,5 (1-class)

Conclusion.

1. The results of physical preparedness tests, observations of the technical-tactical actions in competitions for young players of 14-16 years found that they had slightly lower average of development of speed qualities, dynamic strength, anaerobic and aerobic endurance, compared with standard indicators program of SCYUSSHOR [2].

2. Studies have shown that in response to physical activity in young players observed functional changes in the cardiovascular system: bioelectrical activity of the heart, increased systolic and minute blood volume, cardiac hypertrophy. These changes contribute to the growth of functional and physical fitness.

3. Based on the analysis of performance of functional state of cardiovascular system and the physical preparedness of young football players of 14-16 years with the purpose to improve sports performance can make corrections of training programs.

Prospects for further research – correction of training programs, plans based on indicators of the functional state of the cardiovascular system and the physical preparedness of young players.

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SOLES DERMATOGLYPHICS IN THE PROGNOSIS OF SPORT ENDOWMENTS: FORMING OF SOLES DERMATOGLYPHICS IN THE UKRAINIAN POPULATION (information 1)

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Annotation. Comparative indexes are considered for determination of dermatoglyphic markers feet in relation to a sporting gift. In an experiment took part 209 youths and 198 girls in age 17-19 years. Studied conformities to the law of the phenotypical forming of dermatoglyphics of feet at the persons of Ukrainian population. Differential differences are found between the dermatoglyphics of feet for men and women. Distributing of dermatoglyphic phenotype is resulted on two feet for men and women which do not go in for sports. It is established that most often for men and for women phenotype of LW is formed. For men it can find out this phenotype more frequent (39,5%), than for women (26,8%). Phenotype of ALW for people does not meet of both sexes. Last phenotype is distributed mainly evenly: from 3,1 to 12,2% for men and from 5,3 to 14,9% for women. The population presence of dermatoglyphic phenotype of LA has some differences. For women phenotype meets more frequent (19,4%), than for men (13,9%).
Keywords: dermatoglyphics, population peculiarities, genetic markers, phenotype.

Introduction

Dermatoglyphic of hands (fingers and palms) is one of the most informative genetic markers of susceptibility of person to certain diseases, forming signs or tendency of people to high specific manifestation (physical or mental) abilities [4]. Identification of genetic markers of certain ability is only possible in matching display features (such as dermatoglyphics) in different population groups. For example, in studies of dermatoglyphics markers of athletic talent might be match balance phenotypic manifestation of dermatoglyphics at healthy people who do not go in for sport and at athletes. Differential differences on certain attribute of dermatoglyphics can be considered a genetic marker. The presence of genetic markers in a child can be considered as a prerequisite to the prognosis of certain signs or professional inclinations. Hence the problem of determining the genetic markers of athletic talent is actual scientific problem.

The first step in its solving is an estimation of population characteristics of the formation of dermatoglyphics. Population characteristics of dermatoglyphics were studied only hands. Found differential differences of dermatoglyphics sign in people of different nationalities, countries and even different regions of the same country [6-10]. N.V. Bagatskaya et al. [3] compared dermatoglyphics of fingers and palms of the hands in the population of Kharkiv an ethnic Russian and Ukrainian. L.I. Tehako et al. [5] studied dermatoglyphics of men and women residents of different regions of Belarus, and N.A. Danilov et al. (L.P. Sergienko, 2012) – population in different regions of Russia. Significant are differences of dermatoglyphics signs in males and females of one population [1]. However, population characteristics of dermatoglyphics of feet is not until studied.

The work is done according to the plan of research of the Open International University of Human Development "Ukraine".

Aim, tasks, material and methods.

The aim of the study is to determine the quantitative criteria of dermatoglyphics signs of feet of men and women population of Ukraine.

Tasks of work were the following:

1. Identify the features of formation of dermatoglyphics of feet in youth of southern part of Ukraine.
2. Compare quantitative signs of feet dermatoglyphics in men and women.

Methods and materials of research. Fingerprints and soles of the feet have been studied by the method proposed by T.D. Gladkova. We used fingerprinting method using water-soluble black ink. To do this, use a device that consisted of boards and roller-coasters [2]. Ink applied to the surface of the foot even layer. Prints patterns of soles obtained by rolling your feet on a piece of paper that is placed on the platen from the heel to the toes. Thumb filmed separately.

Analysis of dermatoglyphics signs performed by the method of H. Cummins, C. Midlo (Y.S. Guseva, 1986). Dermatoglyphic signs were studied on the thumb (Fig. 1) and feet (Fig. 2, 3). Dermatoglyphic patterns on the big toe are similar to pattern of fingers. In our study is studied types of dermatoglyphics patterns of the thumb (A, L, W) of right, left foot and two feet in total, the number of deltas and scallops separately on each and two legs, scallops in patterns of cranial determined by the total count of the right and left sides (Fig. 4). As sole dermatoglyphics patterns were determined following indicators: number of patterns, deltas and scallops on the right, the left leg and two legs. Were evaluated following phenotypes of dermatoglyphics of feet (pattern thumb is not considered):

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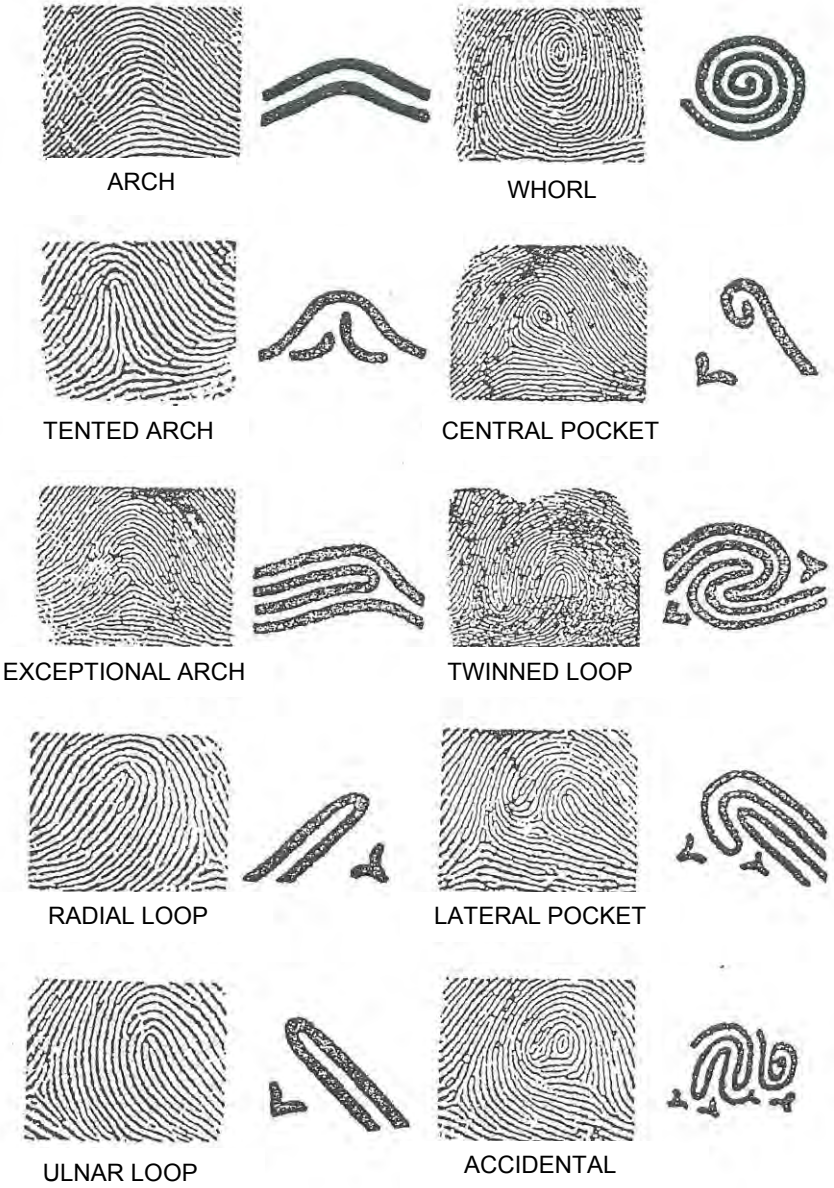

Fig. 1. Main types of dermatoglyphics patterns of fingers and sole

Without delta patterns – whorls (A, At, Ae), one-delta patterns – tibial (Lt) or radial (R) and fibular (Lf) or ulnar (U), two-delta patterns – whorls (W) and composite whorls (WL); central pocket (CP), double loop (TL), lateral porcket (LPL), three-delta patterns (ACC) – combination A, W, WL.

- ALW – phenotype that has whorls, arch and loops;
- LW – phenotype that has loops and whorls with great amount of loops;
- WL – phenotype that has whorls and loops with great amount of whorls;

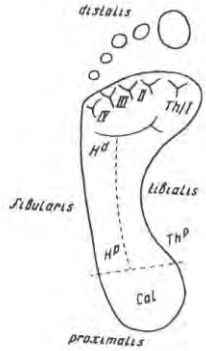

Fig. 2. Toe-pads

II, III, IV – interfinger pads; Th/I (Th^d) – pad of great toe or distal tenar; Th^p – tenar proximalis; Cal – calcar area; H^d i H^p – distalis and proximalis areas of hypotenar

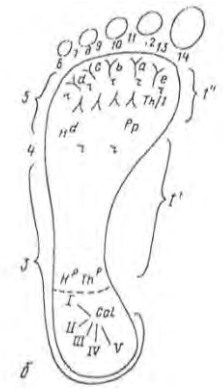

Fig. 3. Fields, three-radius and lines of sole

1–14 – sole fields; a, b, c, d, e – toe three-radiuses; P_P – low extra three-radiuses; I–V – direction of papillary lines in calcar (heel) area

- SLSW – phenotype that has same number of dermatoglyphics loops and whorls;
- L – phenotype that has only loops patterns;
- W – phenotype that has only whorl patterns;
- LA – phenotype that has loops and arch patterns with great amount of loops;
- AL – phenotype that has arch and loops patterns with great amount of dermatoglyphics arches.

Fig. 4. Ridge account between delta and center in the whorl pattern

In research took part 407 persons of population of South region of Ukraine (Kherson) aged 17-19 years old (among them 209 men and 198 women).

Results.

Dermatoglyphics of big toe. The distribution of the main types of dermatoglyphics patterns on the first finger of the right and left leg and total on two legs are given in Table 1. Analyzing the data we note that most often the first toes have loop patterns (L = 81,6% men and 73.5% in women). This is somewhat higher percentage in comparison with the general trend of distribution dermatoglyphics types on the fingers. In the men's division arc (A) and cranial (W) patterns almost similar (respectively 9.1 and 9.3%). For women, there is a greater availability of arc (16.9%) than cranial (9.6%) patterns. Differences between the types of patterns fingers are essential. On arcs on the fingers of Ukrainian population occurs 3-8% of people, and cranial pattern - 20-37% (L.P. Sergienko, 2012). That arc patterns on the first toe seen in people of both sexes more than the fingers. For cranial patterns trend is the opposite. Note also that women almost twice as likely to occur arc patterns than men.

Table 1

Distribution of major dermatoglyphics patterns on the first toes in male and female

Sex	Types of dermatoglyphics patterns on the first toe							
	A		U		R		W	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Right leg								
Men	20	9,6	166	79,4	7	3,3	16	7,7
Women	31	15,7	148	74,7	3	1,5	16	8,1
Left leg								
Men	18	8,6	8	3,8	160	76,6	23	11,0
Women	36	18,2	8	4,0	132	66,7	22	11,1
Total on two legs								
Men	38	9,1	174	41,6	167	40,0	39	9,3
Women	67	16,9	156	39,4	135	34,1	38	9,6

Quantitative indicators of the presence of large deltas on the toes are shown in Table 2. Quantitative deltas on the right and left leg in men and women are almost similar. There is a similar trend of deltas presence on the big toes in men and women.

Table 2

Quantitative indicators $\left(\overline{X} \pm m\right)$ *of dermatoglyphics deltas on the first toe of men and women of Ukrainian population*

Sex	Legs		
	Right	Left	Total on two legs
Men	0,96 ± 0,027	0,98 ± 0,026	1,94 ± 0,043
Women	0,91 ± 0,033	0,92 ± 0,037	1,83 ± 0,062

Trend of quantitative display of dermatoglyphics scallops on the first toes presented in Table 3. Note the presence of more scallops on the thumb of right and left legs of men than women. Somewhat more significant, although not significantly, quantitative scallops on the right than on the left leg.

Table 3

Quantitative indicators $\left(\overline{X} \pm m\right)$ *of dermatoglyphics scallops on the first toe of men and women of Ukrainian population*

Sex	Legs		
	Right	Left	Total on two legs
Men	13,00 ± 0,544	12,61 ± 0,523	25,60 ± 0,988
Women	10,91 ± 0,524	10,61 ± 0,567	21,52 ± 1,011

When comparing dermatoglyphics patterns (deltas and scallops) in the first toes obviously more complicated dermatoglyphic pattern in men than women.

Dermatoglyphics of feet soles. Number of sole dermatoglyphics patterns of various types was relatively low (Table 4). Although their distribution has a tendency: 1) on the right foot in both men and women there more patterns than in the left foot; 2) men have more dermatoglyphics patterns on two feet than women.

Table 4

Quantitative indicators $\left(\overline{X} \pm m\right)$ *of dermatoglyphics of feet sole of men and women of Ukrainian population*

Sex	Legs		
	Right	Left	Total on two legs
Men	1,88 ± 0,064	1,72 ± 0,060	3,60 ± 0,110
Women	1,60 ± 0,053	1,54 ± 0,051	3,13 ± 0,090

Phenotypic expression of dermatoglyphics deltas and scallops on sole of two feet of the surveyed boys and girls are given in Table 5. Under previous laws in men was more significant number of deltas and scallops on the right than on the left leg. Moreover, these figures were quantitatively greater in men than women.

Table 5

Quantitative indicators $\left(\overline{X} \pm m\right)$ *of dermatoglyphics deltas and arch on the sole of feet of men and women of Ukrainian population*

Sex	Legs		
	Right	Left	Total on two legs
Deltas			
Men	2,11 ± 0,087	1,94 ± 0,089	4,05 ± 0,162
Women	1,85 ± 0,080	1,68 ± 0,081	3,53 ± 0,143
Arches			
Men	44,40 ± 1,944	40,61 ± 1,927	85,01 ± 3,565
Women	37,26 ± 1,722	32,15 ± 1,543	69,41 ± 2,939

Distribution of dermatoglyphics phenotypes on two legs in men and women who are not involved in sports, are given in Table 6. Observe that most often both men and women formed phenotype LW. Although in men this phenotype can be detected more frequently (39.5%) than women (26.8%). Phenotype ALW at people of both sexes are not meeting. Recent phenotypes are distributed mostly evenly, from 3.1 to 12.2% in men and from 5.3 to 14.9% in women. Population presence is a little bit difference in dermatoglyphic phenotype LA. In women the phenotype is more common (19.4%) than men (13.9%).

Table 6

The distribution of phenotypes of dermatoglyphics of the feet soles of men and women of Ukrainian population

Sex	Phenotypes of dermatoglyphics of the feet															
	ALW		LW		WL		SLSW		L		W		LA		AL	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Men	0	0	165	39,5	13	3,1	47	11,2	47	11,2	37	8,9	58	13,9	51	12,2
Women	0	0	106	26,8	21	5,3	38	9,6	42	10,6	53	13,4	77	19,4	59	14,9

Conclusion

1. At first studied patterns of phenotypic formation of legs dermatoglyphics of Ukrainian population persons.
2. Found differential differences between dermatoglyphics of feet in both men and women.
3. A more complex structure of dermatoglyphics of feet in men than in women.

Prospects for further research is to determine the differences of population structure dermatoglyphics legs with feet dermatoglyphics of people of different professional groups. This may provide future determination of dermatoglyphics feet bullets of different abilities. Such information will be useful in the technology and professional sports selection.

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PROPERTIES OF PLAYING AND TACTICAL THINKING OF FEMALE HANDBALL PLAYERS WITH DIFFERENT QUALIFICATION

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Annotation. Basic properties of varieties of tactical thought of handballers are considered. The level of their display is shown for the sportswomen of different qualification. 78 sportswomen took part in research. For determination of parameters of tactical and playing thought the method of «Balltest» is utillized in an attack and defense. Priority of exactness and speed of thought is set depending on the level of sporting trade of handballers. Different influence of speed of thought is well-proven on the rightness of decision of playing situations of different orientation in the handballers of mass digits and high level of display of the indicated properties of thought for the sportswomen of high qualification. It is discovered that a level of display of basic properties of tactical thought is in defense substantially below of other varieties of thought. It is marked that with the increase of trade of players there were possibilities to growth of quantitative and speed parameters of tactical thought.
Keywords: playing, tactical, thought, exactness, speed, handball.

Introduction.

Modern sports achievements are determined by many factors, among which are significant new technologies. By creating new production facilities shall optimize training and competitive processes in all sports. [2]

A special place in the modern development belongs to diagnostic technologies of physiological abilities of athletes who according to A. Rodionov, V. Sopova, V. Nepopalova [9], V. Voronov, S. Shutov [6], N. Glazkova [7], M. Bezmylova [4] designed for the study of mental abilities that have a structure of very resistant properties with changeable structure that is under the influence of sport training.

The most efficient use of psychodiagnostic technologies currently recorded in sports games, which allows monitoring of tactical readiness based on psychophysiological abilities of players that underlie their tactical thinking. In the works of A.G. Bazylevskiy [3], V.A. Suprunovych [10] on the basketball players and football players is shown the influence of psychomotor and neural functions in the manifestation of tactical thinking.

Since tactical thinking of athletes of playing sports become apparent in extreme conditions of competitive struggle, it involves rational choice of positional advantage in the rapidly changing game situations. The complexity of the situation of choice, whether it is a standard tactical schemes, or custom actions of players, is limited information because of the time limit on its perception and analysis, which means that tactical thinking essentially depends on the formation of its operating components [8, 11-13]. In turn, tactical thinking, as a mental act, is a part of the decision-making athlete in the game, the accuracy of which, according to A.G. Volosovych [5] and O.G. Abalyan [1], correlates with complex sensomotor reactions. The detection rate, perception of the stimulus and appropriate response on it significantly affects the quality parameters of tactical thinking of athletes.

Analysis of the results of research on technology diagnostic of tactical thinking of basketball and football players showed that there are certain features of the speed solution of athletes set of tasks that, according to A.G. Bazilevskiy [3], V.A. Suprunovych [10], based on an unequal reaction on game situations offensive and defensive focus. But data on the speed of thinking in solving tactical tasks in the work have been identified.

For diagnostic technologies of tactical thinking of handball players in previous studies of tactical thinking it was found its quantitative parameters at different stages of many sports improvement and therefore remain open questions of speed characteristics of thinking.

The work is done according to the plan of SRW of Cherkasy National University named after Bogdan Khmelnitsky.

Aim, tasks, material and methods.

Aim of research: to study the characteristics of displaying properties of game and tactical thinking in handball players of different skills.

Tasks of research:

1. To establish parameters of tactical and playing thinking in attack and defense for its basic properties at handball players of different skills.

2. To find out the peculiarities of the basic properties of thinking in dealing with game situations of different directions on separate levels of sportsmanship.

Methods: theoretical analysis and synthesis of scientific and technical literature, test of tactical thinking and methods of mathematical statistics.

To determine the parameters of tactical and playing thinking in attack and defense is used methods «Balltest» [Patent 43456 Ukraine, MPK (2009) A 61 B 5/16. Method of determining physiological characteristics to assess the level of special preparedness of athletes in team sports games / Glazyrin I.D., Frolova L.S., Frolov O., Bondar V.V., Zhanyayko G.V., Vernihora V.V., Holovaty V.M., Suprunovych V.A.; patentee Glazyrin I.D., Frolova L.S., Frolov O.,

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Bondar V.V., Zhanyayko G.V., Vernihora V.V., Holovaty V.M., Suprunovych V.A. - № u200806398; announce 14.05.2008; publ. 25.08.2009, Bulletin № 16.], namely test tasks for field players, according to which recorded:

- the number of correct answers out of 15 tasks for each kind of thinking;
- total time spent on the provision of correct answers for each kind of thinking.

Speed thinking of each species computed from the ratio of the total time spent on providing correct answers to their number.

Organization of the study: were investigated 78 handball players of Kiev Children and Youth Sport School № 2, KSLI, commands "Spartak" Kyiv, "Sparta" Krivoy Rog, including 28 people with sports qualification of youth level, 24 people - I-II classes, 12 people – Candidate to Master of Sports, 10 people - Master of Sports.

Results.

According to the results of studies on the handball players of different qualifications it is obtained data on the parameters of the game and tactical thinking in solving problems of various kinds of game.

Thus, data of game thinking in the attack pointed to the fact that the highest number of correct answers, as expected, recorded at a group of handball players masters of sports, that in 1.52 times ($p < 0.05$) and 1.88 times ($p < 0.05$) more than the results of group of athletes accordingly I-II classes and Candidate to Master of Sports.

This quantitative indicators of game thinking in attacking in the group of handball players of junior classes are significantly lower than indicators of I-II-classes handball players and Candidate to Master of Sports – in 3.07 times ($p < 0.05$) and 3.43 times ($p < 0.05$) (Table . 1).

Table 1

Indicators of game thinking in attacking of handball players of different qualification ($\overline{X} \pm S$)

Parameters of thinking	Researched groups of handball players			
	Speed of thinking (c) (12-14 years) (n=28)	I-II class (15-16 years) (n=24)	Candidate to Master of Sports (17-19 years) (n=12)	Master of Sports (20-34 years) (n=10)
Number of right answers (times)	6,14±0,47	9,21±0,62**	9,57±0,58	11,09±0,66*
Speed of thinking (c)	3,42±0,15	3,38±0,12	2,23±0,14#	2,05±0,16

Note: *p<0,05 – credibility of differences between group of Candidate to Master of Sports and Master of Sports; **p<0,05 – credibility of differences between group of I-II classes of youth class; #p<0,05 – credibility of differences between group of Candidate to Master of Sports and I-II classes.

That is, we can point to the fact that at handball players of youth level playing handball thinking in the attack is not enough formed, in contrast to the more skilled handball players, quantitative indicators which confirm the existence of opportunities for improvement in the process of sports training.

At the same time, the thing of differences in quantitative measures of skilled handball players are, as shown previous studies, in game specialization of skilled handball players significantly affect the priority of their thinking. That is, a group of masters of sports, unlike groups and Candidate to Master of Sports and II-class, numbered incorporates of most linear and angular players playing, the level of thinking in the attack is significantly higher than the level of other players' roles.

Comparing indexes of speed of thought, you can specify that they are more stable than quantitative parameters. Athletes of youth and II classes have almost the same speed of game thinking in the attack ($p > 0.05$), as well as athletes of groups of Candidate to Master of Sports and Master of Sports ($p > 0.05$), but the last mentioned group of handball players found higher speed properties of the thinking process, as the difference between groups I and II classes and Candidate to Master of Sports was 1.15 s ($p < 0.05$). We can assume that this difference is associated with more rapid recognition of game situations by skilled handball players, because of their greater competitive experience and higher mental abilities of selection decisions.

Study of game thinking in defense showed that quantitative parameters of studied groups of handball players and I-II classes to Master of Sports were at the same level ($p > 0.05$) while parameters of junior level were significantly lower ($p < 0.05$) (Table 2.).

Table 2

Indicators of game thinking in protecting of handball players of different qualifications ($\overline{X} \pm S$)

Parameters of thinking	Researched groups of handball players			
	Junior classes (12-14 years) (n=28)	I-II class (15-16 years) (n=24)	Candidate to Master of Sports (17-19 years) (n=12)	Master of Sports (20-34 years) (n=10)
Number of right answers (times)	5,44±0,25	6,25±0,54**	6,66±0,45	7,08±0,41
Speed of thinking (c)	4,15±0,15	3,85±0,16	2,58±0,16#	2,24±0,15*

Note: *p<0,05 – credibility of differences between group of Candidate to Master of Sports and Master of Sports; **p<0,05 – credibility of differences between group of I-II classes of junior class; #p<0,05 – credibility of differences between group of Candidate to Master of Sports and I-II classes.

For speed of thinking, the figures of handball players of junior and I-II classes were almost identical (p<0,05). Compared with athletes of mass classes at highly qualified handball players speed of thinking significantly higher (p<0,05), along with this there is a significant difference of indicators of Candidate to Master of Sports and Master of Sports, which was 0,34 c (p<0,05).

Comparing the manifestation of tactical thinking in the attack can say that handball players of I-II classes almost twice gave accurate answers from junior classes, and the difference in performance was 1.93 times (p<0,05).

In turn, compared with I-II classes, handball players of sports qualification Candidate to Master of Sports gave more correct answers in 5.64 times (p <0.05). Accuracy of tactical thinking in attacking of handball players of sports qualification Candidate to Master of Sports and Master of Sports was at the same level (p>0,05).

Regarding speed of tactical thinking in the attack, the significant difference between the figures recorded only between groups of handball players of mass classes (junior and I-II class) and highly qualified players (Table 3).

Table 3

Indicators of tactical thinking in attacking of handball players of different qualification ($\overline{X} \pm S$)

Parameters of thinking	Researched groups of handball players			
	Junior classes (12-14 years) (n=28)	I-II class (15-16 years) (n=24)	Candidate to Master of Sports (17-19 years) (n=12)	Master of Sports (20-34 years) (n=10)
Number of right answers (times)	2,65±0,61	4,58±0,63**	10,22±0,69#	10,81±0,71
Speed of thinking (c)	3,54±0,19	3,31±0,18	2,14±0,19#	1,87±0,18

Note: **p<0,05 – credibility of differences between group of I-II classes of junior class; #p<0,05 – credibility of differences between group of Candidate to Master of Sports and I-II classes.

Considering the performance of tactical thinking in protecting we can specify that the quantitative parameters of handball players of each subsequent group with higher qualifications were significantly higher. In this row of parameters the lowest level of accuracy of thinking demonstrated by athletes of junior class (p<0.05), and the highest – masters of sports (p <0.05) (Table 4).

Table 4

Indicators of tactical thinking in protection of handball players of different qualification ($\overline{X} \pm S$)

Parameters of thinking	Researched groups of handball players			
	Junior classes (12-14 years) (n=28)	I-II class (15-16 years) (n=24)	Candidate to Master of Sports (17-19 years) (n=12)	Master of Sports (20-34 years) (n=10)
Number of right answers (times)	2,73±0,43	3,92±0,27**	5,14±0,52#	6,96±0,68*
Speed of thinking (c)	4,59±0,17	4,36±0,17	3,75±0,17#	2,18±0,19*

Note: *p<0,05 – credibility of differences between group of Candidate to Master of Sports and Master of Sports; **p<0,05 – credibility of differences between group of I-II classes of junior class; #p<0,05 – credibility of differences between group of Candidate to Master of Sports and I-II classes.

Speed of tactical thinking in protecting of handball players of junior and I-II classes was almost identical (p> 0.05), while the difference of indicators of handball players of Candidate to Master of Sports and Master of Sports was

reliable ($p<0.05$). Thus much faster demonstrated highly qualified handball players, compared with athletes of mass classes ($p<0,05$).

Studies of variety of thoughts of handball players of junior classes indicated that quantitative indexes of game thinking substantially higher than tactical thinking ($p<0.05$), while the speed of playing and tactical thinking almost the same ($p>0,05$) (fig. 1).

It was also found that the accuracy of the game thinking in attack and defense is almost identical ($p>0.05$), as well as precision of tactical thinking in attack and defense ($p>0.05$). Another situation was observed in the parameters of quick thinking, where performance of gaming and tactical thinking protection is much lower the indicators of game and tactical thinking in the attack ($p<0.05$)

In addition, the lowest rate shown handball players in solving tactical problems in protection ($p>0.05$), and the highest – In solving the game and tactical thinking in the attack ($p<0.05$).

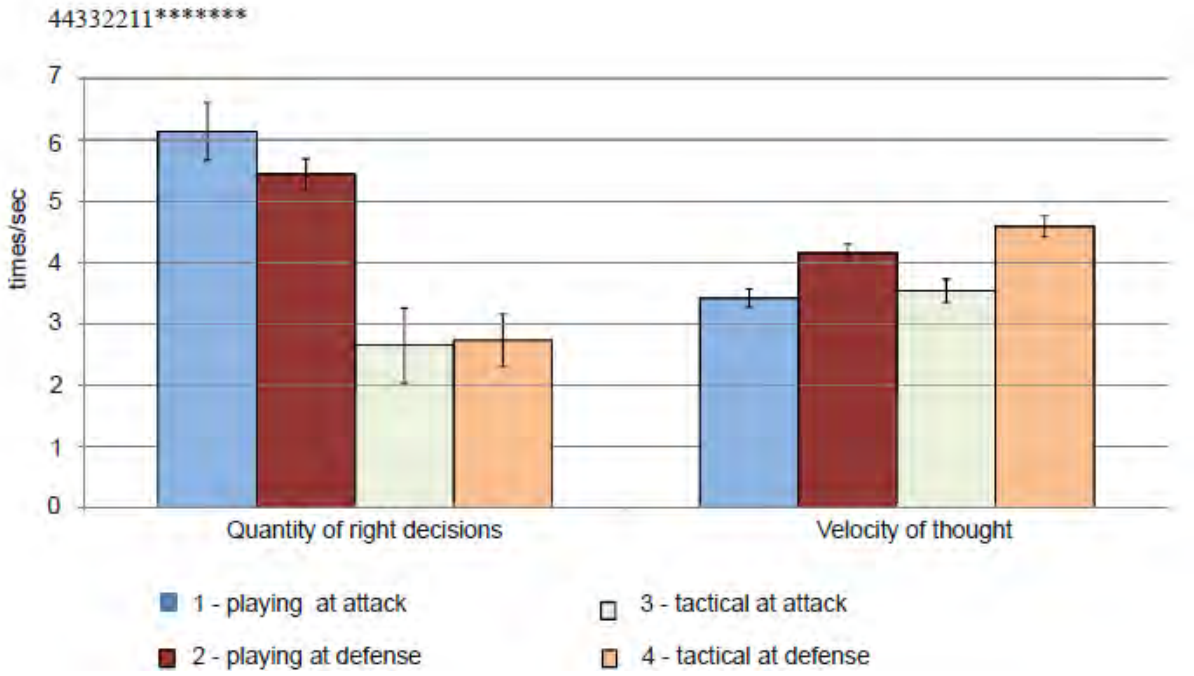

Fig. 1. Comparison of quantitative and speed indexes of varieties of thinking of handball players of junior class:
**p<0,05 – credibility of differences of indexes of game and tactical thinking;*
***p<0,005 – credibility of differences of indexes of attack and defense.*

At group of handball players of I-II classes is observed similar to junior classes' situation of displaying varieties of thinking. Thus, the accuracy of the game thinking significantly higher than the precision tactical thinking ($p<0.05$), but unlike the junior classes, the number of correct decisions of gaming tasks in the attack is significantly higher than the number of correct decisions of game thinking in protection ($p<0.05$) (Fig. 2).

Speed of game thinking of this group of handball players differed little from the speed of tactical thinking ($p>0.05$), the highest rates recorded from the game and tactical thinking in the attack ($p<0.05$) and the lowest rate – when solving tactical problems in protection ($p<0.05$).

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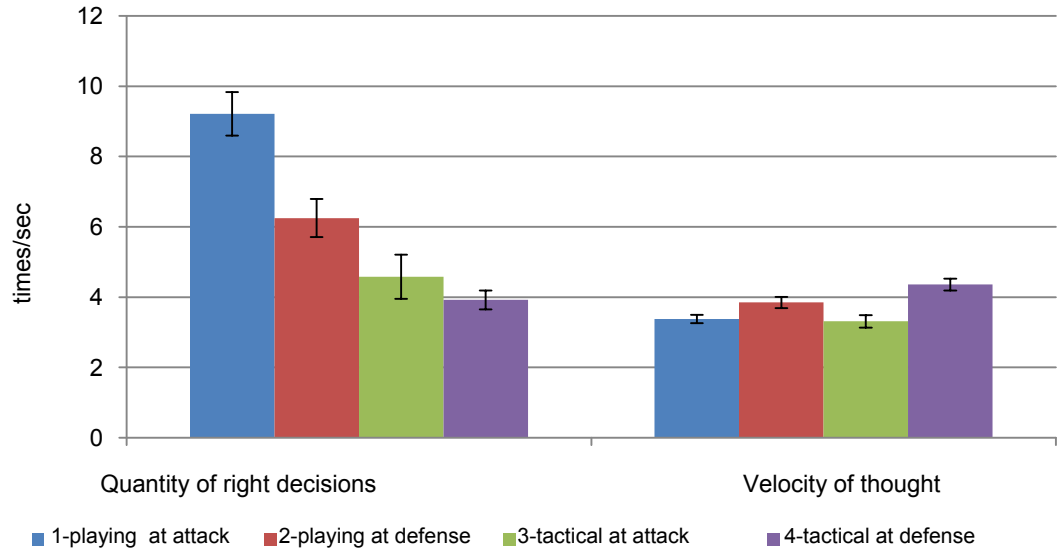

Fig. 2. Comparison of quantitative and speed indexes of varieties of thinking of handball players of I-II classes:
**p<0,05 – credibility of differences of indexes of game and tactical thinking;*
***p<0,005 – credibility of differences of indexes of attack and defense.*

Research in the group of handball players with sports skills Candidate to Master of Sports showed that the accuracy of solution to gaming and tactical problems almost at the same level (p>0.05). The number of correctly solved game tasks in attack was the same as the number of correctly solved problems in tactical tasks in attack (p>0.05), as was almost the same precision were gaming and tactical thinking in protecting (p> 0.05) (Fig . 3).

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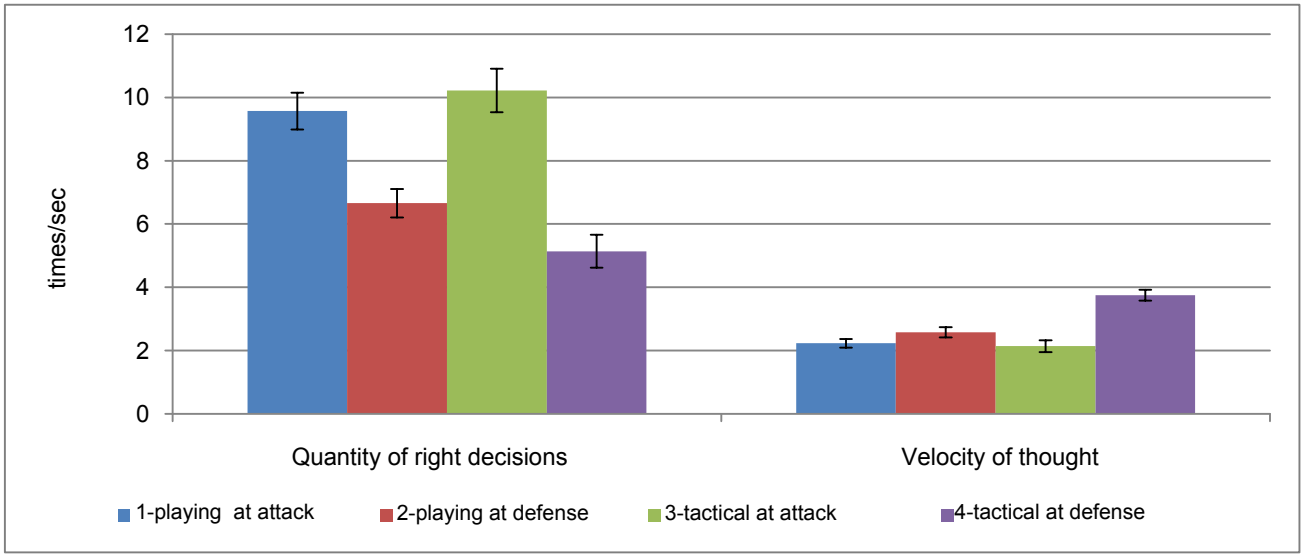

Fig. 3. Comparison of quantitative and speed indexes of varieties of thinking of handball players of Candidate to Master of Sports:
**p<0,05 – credibility of differences of indexes of game and tactical thinking;*
***p<0,005 – credibility of differences of indexes of attack and defense.*

For quick of thinking, it should be noted that the highest rate recorded in solving tactical tasks in the attack (p<0.05), and the lowest - in solving tactical tasks in protection (p>0.05). The following situation is also observed: when speed of solving game tasks in protection as opposed to indexes of handball players of mass classes, approach to the rate of solving game tasks in attack (p>0.05).

Analyzing the data of handball players group of sports qualification of master of sports can be stated that there were almost identical quantitative parameters of the tasks of tactical and playing thinking in the attack (p>0.05), as

well as tactical and playing thinking in protecting ($p>0.05$). But there was a significant difference of indicators of correct decisions in the attack and defense as game as tactical thinking (Fig. 4).

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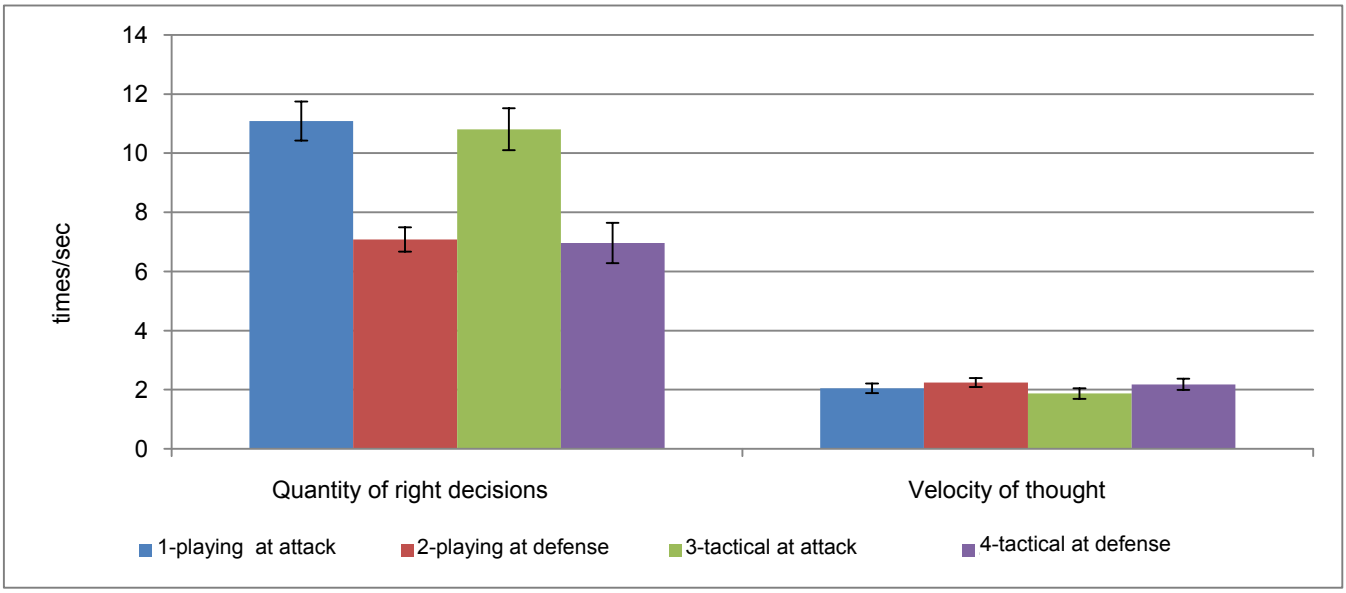

*Fig. 4. Comparison of quantitative and speed indexes of varieties of thinking of handball players of Master of Sports: **p<0,005 – credibility of differences of indexes of attack and defense.*

Unlike quantitative parameters speed of game thinking in attack and defense, and tactical thinking in protecting almost leveled ($p>0.05$). But, like the data of handball players of sports qualification of Candidate to Master of Sports, the highest rate recorded in solving tactical tasks in the attack ($p<0.05$).

Conclusion.

1. In deciding game situations from variety of thinking high accuracy of answers on the tasks do not always match the high speed, but beside the game thinking in the attack, where the level of these properties thinking fairly high compared to other kinds of thinking and independently on sports qualification.

2. High accuracy of solution of game problems with tactical thinking in the attack against the high speed inherent handball players of high qualifications, which is not observed in athletes of mass classes, which is caused by the difference of playing experience as positional tactical scheme is the basis of tactical training teams of craftsmen.

3. Revealed that the level of manifestation of the basic properties of tactical thinking in protecting significantly lower than other types of thinking, regardless of sports qualification of handball players, while with increasing of skills of players observed opportunities to increase its quantity and speed parameters.

Further study is expected to take place in the study of other problems of displaying properties of the game and tactical thinking in handball players of different qualifications.

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THE EFFECTS OF OMEGA-3 INTAKE ON DELAYED ONSET MUSCLE SORNESS IN NON-ATHLET MEN

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Annotation. Delayed onset muscle soreness (DOMS) is classified as a muscle strain that presents with tenderness and stiffness one to two days after exercise. At present there are multiple proposed methods for treating DOMS, including anti-inflammatory medication, stretching, homeopathy, L-carnitine, rest and light exercise. The purpose of this study was to investigation of the effects of omega-3 intake on delayed onset muscle soreness in non-athlete men. 20 healthy subjects (age: 20.5±1.8 years) participated as subjects in this study. Subjects were randomly divided into two groups (experimental and control). In the experimental group, subjects consume daily 2000 mg of omega-3; 2 times per day for 1 month before and 48 hours after perform leg press exercise with eccentric pattern. Similarly, the c was taking in the control group. The results showed significant decrease in severity of DOMS (CK and LDH levels and decreased knee's range of motion) in experimental group in comparison with control group ($p<0.05$). As a result of our study it is suggested that the use of omega-3 supplement can effectively reduce DOMS caused by eccentric exercise.
Keywords: Omega-3, Delayed onset muscle soreness, Leg press, eccentric.

Introduction.

Delayed onset muscle soreness (DOMS) is classified as a type I muscle strain that presents with tenderness and stiffness one to two days after exercise or unaccustomed movement [4, 23, 29]. DOMS and muscle damage are common self-limiting, training related conditions that can result in loss of muscle force and significant pain [8, 29]. At present there are multiple proposed methods for treating DOMS, including cryotherapy, anti-inflammatory medication, stretching, hyperbaric oxygen, homeopathy, ultrasound, L-carnitine, rest, light exercise and electromagnetic shields [29].

However, to date an effective treatment for DOMS has not been established. Unaccustomed exercise typically causes muscle soreness, which usually begins within 24 hours and peaks within 48 hours after exercise. Eccentric exercise, which occurs when a skeletal muscle lengthens as it produces force, provides a common exercise mode to induce muscle damage [7].

Omega-3 fatty acids are essential in the human diet, as there is no mechanism in humans for producing these fats from other substances. Omega-3 fatty acids serve as precursors to prostaglandins, which are powerful hormone-like substances that reduce inflammation and improve blood flow [9, 19].

There are several investigations dealing with the effects of different methods on reducing DOMS signs and symptoms. Jouris et al (2011) investigated the omega-3 fatty acids supplementation on the inflammatory response to eccentric strength exercise. They reported that omega-3 supplementation decreases soreness, as a marker of inflammation, after eccentric exercise. Based on these findings, omega-3 supplementation could provide benefits by minimizing post-exercise soreness and thereby facilitate exercise training in individuals ranging from athletes undergoing heavy conditioning to sedentary subjects or patients who are starting exercise programs or medical treatments such as physical therapy or cardiac rehabilitation [19]. Pumpa et al (2001) studied the effects of Lyprinol on delayed onset muscle soreness and muscle damage in well trained athletes. They reported that after 2 months ingestion of Lyprinol at the recommended dosage (200mg/day) and a demanding eccentric exercise intervention, Lyprinol did not convincingly affect DOMS and indicators of muscle damage [29]. Burnley et al (2010) investigated the impact of protein supplements on muscle recovery after exercise-induced muscle soreness. They indicated that protein or carbohydrate supplement after exercise that caused mild muscle damage did not facilitate muscle recovery in adequately nourished, healthy young men [7].

Yet, omega-3 has not been used as a treatment for DOMS and research background does not exist in this topic, especially in the area of sports science. Also, the existing drugs because of side effects may not have good effects. In addition, anti-inflammatory effects of omega-3 have been investigated in some researches. Therefore the purpose of this study was to investigation of the effects of omega-3 intake on delayed onset muscle soreness in non-athlete men.

Methods.

Subjects.

Among the 40 volunteers participating in research, based on physician and health questionnaire, 20 subjects that were healthy and without previous history of certain diseases and participated as subjects in this study. Subjects were randomly divided into two groups (experimental and control).

Drug intake methods.

After determining the group in a double blind design, subjects in the experimental and control groups consume daily 2000 mg of omega-3 (Viva Omega-3 Fish Oil, made in Canada) or the same amount of placebo 2 times per day

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for 1 month before and 48 hours after perform leg press exercise with eccentric pattern. To control annoying and confounding factors, all subjects were asked to use any drugs during the study. Subjects' diet was controlled by a food frequency questionnaire (FFQ).

Eccentric exercise method.

Leg press exercise was performed at 75% of one-repetition maximum (1RM). Exercise consisted of 4 sets of 20 repetitions with 180 seconds interval rest between sets (Figure1). Eccentric quadriceps contractions occurred during flexion of knee joint and return to starting position.

Figure 1. Eccentric exercise by Leg press machine

Measurement of the maximal isotonic voluntary contractile strength.

The maximal isotonic voluntary contractile strength of quadriceps measured by Leg press machine and Brazinsky formula:

$$1RM=\text{weight (kg)} \times (1.0278-(0.0278 \times \text{repetition})$$

Swelling test.

Swelling was measured with a metric plastic tape-measure. Circumferential measurements were taken of leg with the subject in the prone position (middle thigh circumference). The distance from this circumferential measurement to the popliteal crease was recorded. This was done so that measurements could be taken at the same sites during subsequent visits and a measurement at the corresponding anatomical site on the opposite leg could be taken for comparison [31].

Knee joint angle.

ROM of the knee joint angle was evaluated by measuring the knee angle in flexion position using a goniometer [30].

Level of perceived muscle pain.

The soreness scale used is a Talag soreness scale used by the most recent research on the effects of O3FA on muscle soreness [37].

Measurement of LDH and CK levels.

To determine the levels of blood serum creatine kinase (CK) and lactate dehydrogenase (LDH), 5 ml blood was drawn from antecubital vein and transferred immediately to the lab for assessing CK and LDH analysis. Then, CK and LDH levels were determined using special kits (Pars Azmoon, made in Iran) with AutoAnalyzer (Hitachi, made in Japan).

Statistical Methods.

All descriptive data are expressed as means ± SD. Data were analyzed using ANOVA with repeated measure to compare the mean of each variable between two groups. Statistical analysis was conducted using SPSS 16.0 for Windows.

Results

Subjects' data are presented in Table 1.

Table 1. Subjects' descriptive data

Group	Age (years)	Height (cm)	Weight (kg)	Body fat (%)
experimental	22.5±1.2	174.5±5.2	71.1±6.1	15.68±7.21
Control	23.6±1.4	175.5±47	71.4±9.1	16.21±9.1

The results showed that there is no significant difference in the maximal isotonic voluntary contractile strength of quadriceps between experimental and control groups. But, significant differences were observed between two groups immediately, 48 and 72 hours after exercise (Table 2). There were no significant differences between two groups in middle thigh circumference at baseline and immediate after exercise levels. But, there were significant differences between two groups in middle thigh circumference 24, 48 and 72 hours after eccentric exercise (Table 2).

There were no significant differences between two groups in range motion of knee joint at baseline, immediately and 24 hours after eccentric exercise. But, significant differences were observed between control and experimental groups at 48 and 72 hours after exercise (Table 2). Also, there were no significant differences in perceived pain between

two groups at baseline and immediately after exercise. But, significant differences were observed between two groups at 24, 48 and 72 hours after eccentric exercise (Table 2).

Table 2. Results of isotonic strength, inflammation, Knee joint angle and perceived muscle pain of subjects

variable		Baseline	P	Immediately after exercise	P	24h after exercise	P	48h after exercise	P	72h after exercise	P
Isotonic strength	Omega-3	178.3±4.7	0.27	-	-	175.7±6.59	*0.01	178.45±4.9	*0.000	178.70±4.63	*0.00
	control	181.5±7.6		-		157.5±20.3		150.9±17.3		147.90±19.9	
Middle thigh circumference	Omega-3	51.95±2.8	0.89	53.63±3.08	0.76	52.0±2.72	*0.03	51.95±2.80	*0.001	51.90±2.91	*0.00
	control	51.55±3.65		54.51±3.25		53.4±3.48		53.83±3.71		53.65±3.79	
knee joint angle	Omega-3	51.44±3.33	0.79	53.45±3.60	0.94	51.5±3.19	0.11	51.44±3.33	*0.015	51.37±3.40	*0.02
	control	51.03±3.61		53.33±3.40		53.9±3.19		55.28±3.02		54.85±2.86	
perceived muscle pain	Omega-3	-	0.72	1.80±1.54	0.25	4±0.51	*0.00	0.000±0.000	*0.000	0.000±0.000	*0.00
	control	-		2.60±1.50		4.50±0.84		4.90±0.56		3.10±1.19	
	control	-		4.60±1.26		6.2±1.47		7.00±1.15		6.30±0.823	

* Differences are significant at the 0.05 level.

There were no significant difference between two groups in CPK levels at baseline and 24 hours after eccentric exercise. But, there were significant differences between two groups at 48 and 72 hours after exercise (Table 3). Also, no significant differences were founded between two groups in LDH levels at baseline and 24 hours after exercise. But, there were significant difference in LDH levels at 48 and 72 hours after exercise (Table 3).

Table 3. CPK and LDH levels

Variable		Baseline	P	24h after exercise	P	48h after exercise	P	72h after exercise	P
CPK	Omega-3	186.5±139.17	0.94	427.70±107.81	0.52	406.20±83.11	*0.00	186.5±134.24	*0.000
	control	190.10±73.26		503.6±106.58		569.1±128.29		535.4±139.82	
LDH	Omega-3	297.1±50.47	0.92	540.90±95.79	0.46	5.18.20±88.60	*0.01	292.6±46.5	*0.000
	control	294.90±48.78		582.7±122.31		651.90±124.68		577.6±129.78	

* Differences are significant at the 0.05 level.

Discussion.

This research is the first study in the field of omega-3 supplements to control and prevent delayed onset muscle soreness. The result of perception of pain in the present research is not in agreement with Stone (2002), Williams (2007) and Donnelly (1998) [35, 44, 13]. This difference may be due to the lower amount of muscle damage and differences in the organs and gastrointestinal absorption of omega-3 in this study. Almekinders (1999) and Tartibian et al (2009) also reported similar results with investigated the effect of naproxen on perceived pain intensity after eccentric exercise [2, 37].

The results showed that middle thigh circumference as an index of inflammation was increased immediate and 24 hours after exercise, but was not statistically significant. This increase continued in control group at 48 and 72 hours after exercise and significant differences was observed between two groups.

The results of present study showed that the range of motion of the knee joint, showed no significant difference immediately and 24 hours after exercise. However, 48 and 72 hours after exercise, no significant differences were

observed between the two groups. However, in this period decreased range of motion in the knee joint in experimental group was less than the control group.

This result is not in agreement with Lenn et al (2002), Stone et al (2002), Barlas et al (2000) and Tokmakidis et al (2003) [21, 5, 39]. This can be attributed to less muscle damage and anti-inflammatory properties of omega-3 in present study.

Also, based on the results, it was observed that creatine kinase levels in both groups during 24 hours were elevated after the delayed onset muscle soreness. However, this increment in the experimental group was slightly lower than the control group. Also, creatine kinase in experimental group was decreased at 48 and 72 hours after exercise and this difference was statistically significant after 72 hours. This result could indicate the potential effect of omega-3 supplementation in reduce exercise-induced muscle damage.

The results of creatin kinase after exercise in contrast to baseline levels, is not in agreement with White et al (2008), Lenn et al (2002) and Sunita et al (2010) [43, 21, 36]. This result is maybe due to differences in type and dose of drugs and methods of exercise.

In summary, the results of this study showed that taking 2000 mg of Omega-3 per day has beneficial effects on controlling and reducing symptoms of delayed onset muscle soreness. However, more research should be done to identify the mechanisms of the drug action and influence dosages on delayed onset muscle soreness.

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EFFECT OF CAFFEINE ON THE AMOUNT OF PERCEIVED PAIN, JOINT RANGE OF MOTION AND EDEMA AFTER DELAYED MUSCLE SORENESS

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Annotation. Delayed onset muscle soreness usually occurs after doing a new unusual physical activity, especially when, associated with repeated eccentric contractions and then it gradually disappears. There is not an extensive agreement in the case of treatment method of soreness signs quick reduction. This research was carried out with the aim of investigation caffeine consumption effect to find a good way in order to reduce the signs of delayed onset muscle soreness. In this semi-experimental with Double-blind design, 16 female volleyball player with an age average of 22.5±2.5 in 2 homogeneous 8 subject control and experimental group were studied. In this research, the effect of caffeine existing in coffee in 5 stages (24h before exercise, 12h before, immediately before exercise, after exercise and 12h after it) and 1mg per 1kg of body weight on amount of perceived pain and range of motion of the joint and edema due to delay onset muscle soreness because of 50 jumps and lands of a 1 meter stage was investigated. The results showed that caffeine consumption has a meaningful effect on reduction of all the expressed signs after eccentric contractions. So it is recommended that physio thrapysts, doctors and athletes use this method to reduce delayed onset muscle soreness consequences after the injury.
Keyword: delay onset muscle soreness, caffeine, edema, pain.

Introduction

Muscle soreness and pain are prevalent experiences that followphysical activities. These experiences come along withmovement limitation, muscular tension, pain, swelling, weakness and reduction of operational power (Abraham, 1997. Cheung, 2003. Cleak, 1992. Gulick, 1996). On the whole, according to the time of occurrence, muscular soreness can be classified as Delayed Onset Muscle Soreness (DOMS) and acute muscle soreness.

DOMS appears afew hours to some days after a session of active exercise.Most of people, who do new and hard physical activities, somehow experience DOMS. Delayed pain starts approximately 8 hours after exercise and gradually reaches its peak within 24 to 48 hours after damage (Abraham, 1997). This pain would disappear within 5 to 7 following days. Pain, soreness, tension, unusual sensitivity and muscular weakness are signs of this phenomenon (Hongling, 2005. Jones, 1987. Miles, 1994. Newham, 1993).

There is a variety of opinions explaining why muscular soreness is accompanied by signs such as pain and obstruction; some experts believe that pain is the result of theswelling which follows propagation ofproteins, ions, and extra cellular water in muscular myofibrils. Some also state that feeling of pain is due to the release of biochemical materials from damaged cells and incitation of the chemical receivers (Abraham, 1997. Jones, 1987).

Some researchers believe that muscular soreness is resulted from swelling reactions in muscles (Wilmore, 1994).

This phenomenon limits performance of athletes and reduced their proficiencyin later matches. Sometimes the pain and nervous strain arising from this phenomenon transfers to the other team members and the coach and leads to negative psychological influences on their performance. It also may hinder starting and continuance of a sportive activity and might annihilatethe individual's tendency for sport therapy during rehabilitation period. Physicians, sport coaches, physiotherapists and other specialists of sport medicine are interested in preventing or reducing the effect of DMOS at the least possible time. This interest is because of the pain and probably its resultant threatening factors such as reduction of movement extent, reduction ofpower, aggregation of surplus materials, swelling and increase of enzymes.Effective and helpful ways of therapy would increase athlete's sportive performance and accelerate returnee of nonathletic people to their normal lives. Different methods have been proposed to stop or reduce the troubles of this impairment which includes a broad spectrum of therapeutic ways like different kinds of thermotherapy, cryotherapy, massage therapy, electrical stimulation, pharmacotherapy, oxygen therapy, monotherapy and etc (Gulick, 1996). Prescription of these techniques depends on a wide variety of reasons.Preventing the start of impairment syndromesthat includes release of muscular enzymes in blood, early elision of surpluses after exercise, reduction of pain and increasing individual's tolerance of pain, is a basis of the prescriptions.But so far none of these ways have helped to heal pains of delayed onset muscle soreness.

Researchershave investigated effects of caffeine on reducing the pain of muscular damages. Caffeine exists in Alkaloids such as tea, coffee, chocolate and some drinks like Cola (Miles, 1994. Lopes, 1983. Van soeren & et al, 1998). Caffeine's mobility effects on brain and muscles have been proved; the caffeine in coffee is also sedative for muscles, improves body'sresistance during hard sportive exercises and heals muscles'fatigue (Graham, 2001. Gostill, 1978).

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Caffeine is effective to reduce pain because of its role in haltering receivers related to Adenosin in brain (Stanelli 2007).

Adenosin is a molecule which is produced in brain and when it level is increased to the needed point, it joins to the Adenosinreceivers of the brain. This connection leads to fatigue, pain and sleepiness. It also can cause widening of brain's blood veins and consequent increase of oxygen transition to brain cells in time of sleep.The more Adenosinconnection to brain Adenosinreceivers, the more fatigue, pain, and sleepiness is felt by the individual(Daniels, 1998. Kalmar, 1999. Myers, 1997).Adenosinis also secreted in quick reaction to injury and activates pain receivers in body cells (Maclentosh, 1987). Increase of free Adenosin causes vein widening in muscles and increase ofblood circulation. Through this process, Adenosincauses faster expunction of pain-producing materials and increased enzymes during injury (Maugha & et al, 1977). Maridakis (2006) studied effects of caffeine on delayed onset muscle soreness on nine women and proved that caffeine can help to sedation of delayed pain (Maridakis & et al, 2006). In this research pain was investigated asthe only sign of delayed soreness. The research also expressednumerousnegative impairments for excessive consuming of caffeine including anxiety, palpitation,blood pressure increase, urine increase, and sleep disorder(Maridakis & et al, 2006. Edward & et al, 1977).Considering the scanty of researches related to the effect of caffeine on delayed onset muscle soreness, necessity of such studies isrevealed. In the only existing research in this field, Maridakisused caffeine tablet but this research focused on the effects of coffee's caffeine on delay onset muscle soreness. Undoubtedly people have less negative reaction to coffee use than drugs.

This research was carried out in five different steps (including 24 hours before exercise, 12 hours before exercise, immediately before and after exercise and 12 hours after exercise), which in every step the effect of mg of caffeine per 1kg of body weight on amount of perceived pain and range of motion of the knee joint and edema, in subjects' prime legs were investigated after delayed onset muscle soreness.

Methodology:

In this semi-experimental research, 16 female volleyball players were chosen among 37 volunteers and answered a questionnaire about their individual characteristics and health state.

Tests were conducted in 2 eight-member homogeneous groups, called control and experimental groups. The members of these groups didn't have any background of heart-blood and neuro-muscular diseases. They also had an average age of22 $\pm$ 2.5 years old, an average height of 163 $\pm$ 0.5 cm and an average weight of 53. 5 $\pm$ 0.8 kg. The subjects should also have had at least one year of regular participation in weekly exercises. They were also asked not to take part in any activity beyond their routine daily and weekly activities for at least one week before and 24 hours after the test. Moreover, according to the food list provided by the researcher, the subjects were asked to avoided foods and drugs containing caffeine and Anodynes.12 hours to 24 hours before the exercise started, each subjects of experimental group was given a cup of coffee containing 1 mg of caffeine per 1 kg of their body weight and subjects of control group were given a cup of coffee-coloreddrink containing placebo. It is worth mentioning that the coffee used in this study contained 73.5 mg caffeine per 100 gr of coffee. Before starting the exercise that was preceded by measuring weight and height of all subjects, blood samples, all subjects were given theTalag questionnaire of pain perception and according to the pain on the groin muscles of their prime leg; they drew a protracted line which was graded from 0 to 24 on the basis of pain intensity.

The Motion range of subjects` knee joints were measured by goniometer in prone situation and to the maximum degree of painless knee flection and the amount of swelling increase was measured by a tape measure.

The subjects were asked to have the former drinks immediately before the exercise. After 10 minutes of general and exclusive warmup, subjects did 50 single jumpsfrom a platform of 1 meter height at 30 seconds regular intervals. It is necessary to mention thatmuscular soreness of this methodwas proved by a pilot study 3 weeks before the test. Immediately and 12 hours after exercise both groups had the same drinks and after every step, the above mentioned factors were measured again. Then the subject were asked to go home, do their routine activities, avoid using any sedative drugs and come back after 24 hours to do the third step of the test which included measuring the same parameters like former steps. It should be mentioned that to increase the stability of test results of every step, the researchers measured every factor for three times and made use of their average value.

The resulted data from various tests were presented in special tables in different steps of researches, and then statistical analyses were done and research hypotheses were tested.Variability of dependent variables of two groups were analyzed in every step for both groups by ANOVAand Tukey statistical methodsand were compared with the other group's variables by T-Student tests. Meanwhile a statistical level of 0.05 was used to investigate the differences.

Results

As the figures show the cafein consumption has a meaningful effect on changes after eccentric contractions (figure 1). Dynamic range changes were also meaningful between the 2 groups in all of the measurement steps. ($p=0.0001$). It means that the caffeine consumption was able to prevent the further reduction of dynamic range (the 15 percent increase in comparison to 117 percent increase of control group) (figure 2). Also the results show that, 24 hours after caffeine consumption, the average of surrounding size of thigh muscle of caffeine group was meaningfully less than control group($p=0.0001$). It means that caffeine was able to prevent the further increase of surrounding size of thigh muscle in the next 24 hours (figure 3).

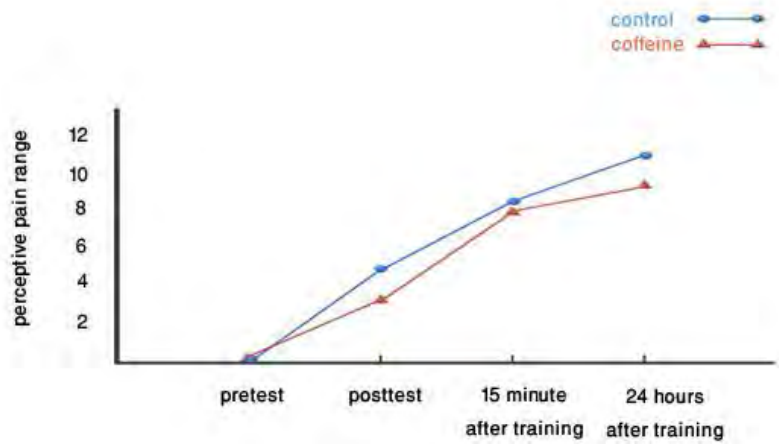

Fig.1. Comparison of pain changes in caffeine and control groups.

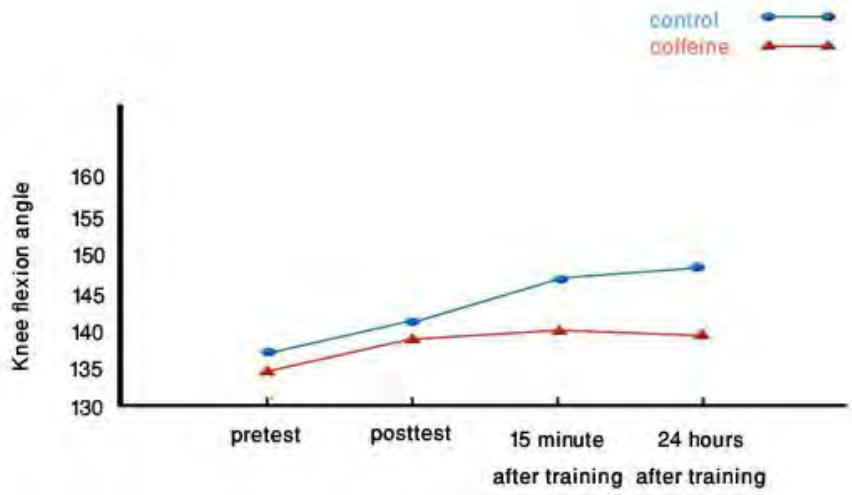

Fig. 2.Comparison of range of motion changes between caffeine and control groups.

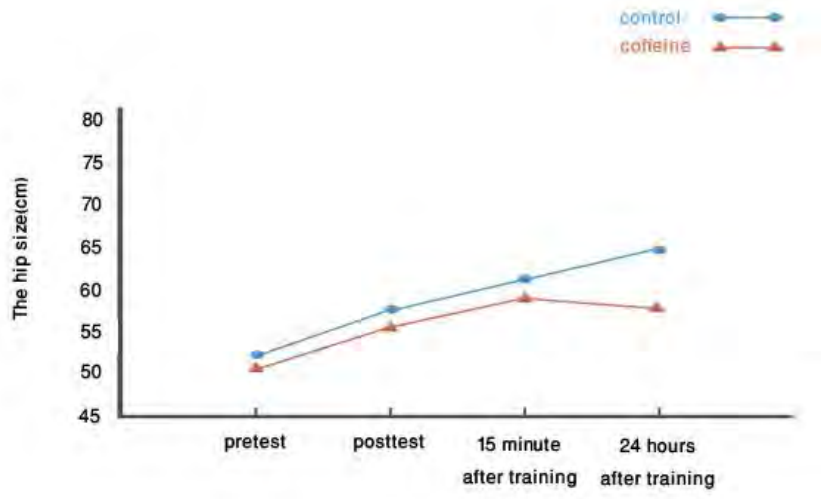

Fig. 3.Comparison of changes of surrounding size of thigh muscle between caffeine and control groups.

Discussion

As it was discussed delayed muscle soreness usually comes after physical activities with new and unusual movement pattern especially when the exercise involves repeated external contractions (Cleak, 1992).

In this research caffeine consumption effect on reduction of delayed soreness impairments was found to be positive and meaningful. It seems that coffee consumption causes awareness of brain and the nerves, prevents the tiredness of muscles and lames the muscles of lung which makes the aspiration easier and because of eliminating the tiredness, increases the time period and amount of the activity, expertise and precision, gives the body truthless power and also improves muscular pain. This fact helps the subjects to use their dynamic range in a better way and increase their resistance and power. The mechanism of caffeine performance is to take the receivers of adnozine in the brain. Adnozine is a molecule which is produced in the brain and while its surface has got to its needed amount, connects to adnozine receivers in the brain. Connection of adnozine molecules to adnozine receivers causes pain and drowsiness feeling. Connection of adnozine molecules to adnozine molecules to these receivers also could make the blood vessels in the brain to get wide and makes carrying oxygen to the cells of the brain. The pain and drowsiness feeling has is proportionate to the number of adnozine molecules connected to the adnozine receivers in the brain (Gulick, 1996. Lopes & et al, 1983. Myers & et al, 1997. Maridakis, 2006).

The structure of caffeine molecule is like adnozine molecule. Because of this similarity, the caffeine molecule is also able to connect to adnozine receivers in the brain and because of this connection, caffeine is able to take the place of adnozine molecule to these receivers and consequently prevent the connection of adnozine to these receivers. Another mechanism of caffeine performance is to prevent the activity of phosphor di straz, which through this process prevents the destruction the secondary messenger molecules (camp), so that CAMP will be able to motivate neurotic cells for a longer time. This performance of CAMP in motivation of neurotic cells causes the improvement and increase of brain activity and consequently muscular activity.

It seems coffee consumption causes the pain decrease and it may prevent the increase of free ADNOZINE withdilation of blood vessels and subsequently increase of perfusion to the muscles causes the better waste disposal and consequently eliminate pain producers faster so that the pain of accumulation of metabolic material because of masculine fibril microscopic injury could be minimum. Also it seems that CAFEIN because of its ability of increasing the release of calcium from the SARCO PLASMIC causes the force and masculine power improvement.

Conclusion:

Results of this research expressed that consuming 5 mg of caffeine existing in coffee, per 1 kg of body weight, is effective in decreasing the syndromes of delayed onset muscle soreness from 24 hours before to 12 hours after DOMS. So it is suggested that physiotherapists, physicians, sport specialistsand athlete's use this method to minimize DOMS and afterwards to prevent decrease of routine operational strength and athletes operation. Also, they can use this method to prevent disappointment of nonathletic people after muscular soreness arising from hard damages.Of course, according to the negative impairments of excessive caffeine consumption on blood pressure, heart beat and etc, it is better to avoid the excessive consumption.

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